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THE CHEMICAL BASIS OF LIFE

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IT was in 1868 that Professor Huxley, in Edinburgh, that city of intellectual light, made the memorable declaration for the first time in a formal fashion that life has a physical basis; this substance was at that time known as "protoplasm," it has since been named "bioplasm"; but it was the notion that life should have a physical basis at all that was unfamiliar to the biological laity at the end of the sixties. This notable declaration, especially from its having been made on a Sunday evening, was the subject of not a little acrimonious comment.

Life without a physical basis is unknown to science, whatever may be conceivable by the human mind. But the concept to which I now wish to advance is, that the time has come for us to realize that it would be more accurate to speak of the *chemical*, rather than "the physical basis of life." From the most general point of view that we can take, it must be obvious that no kind of matter, non-living, dead, or alive, can possibly exist outside the realm of the operation of the laws of chemical affinity. From this exceedingly wide conception there certainly flow several very important consequences related to our thesis, but my present standpoint is rather this, that what we know as the various manifestations of vitality are conditioned by, or actually related to, the precise chemical configuration or constitution of this substance—the so-called protoplasm.

Now this is not a truism: it is not self-evident that the same laws which govern purely chemical operations in the laboratory should govern in precisely the same way phenomena which we have always called vital. It is more intensely true that life is a chemical

rather than a physical affair; for does not life depend in an exceedingly intimate fashion on the chemical affinity between oxygen and hæmoglobin as well as on the chemical affinity for oxygen possessed by the living matter which can only subsist by constantly incorporating that gas within it? Life is, in a very real sense, oxidation; but what is oxidation other than the chemical union of oxygen and certain other chemical elements—carbon, hydrogen, sulphur, or phosphorus—wherever these elements happen to be found? Oxygen is in a very real sense the *gaseous* basis of life.

It is equally true that digestion, for instance, is a chemical affair; it can proceed to a certain point as efficaciously in a glass vessel as inside the living stomach, and it is influenced in the glass vessel by agents and agencies in exactly the same way as it is in the living body: alcohol, for instance, slows the process in both cases.

But there is a school of physiologists which would go farther and assert that nutrition (assimilation) is from first to last a purely chemical affair, that it depends on the affinities of certain molecules of food for certain molecules of protoplasm. That great vital cycle which may be said to begin with the discharge of animal waste-products, which are then fermented by bacteria into the nitrate food for plants, are worked up by these plants into their food-reserves, are eaten by herbivora, which are eaten by ourselves, is, in each link of it, chemical; either a synthesis or a decomposition. The reason that gelatine by itself will not support life has been discovered to be that it does not contain a substance of some chemical complexity, tyrosin, found in all other nitrogenous food. That one man's food is his neighbour's poison must depend upon the chemical constitution of their tissues.

Or again, evidence is accumulating every day that the explanation of fatigue is a problem in organic chemistry; a fatigued person is one in whose body-fluids are circulating in solution certain "katabolites," as they are called, bodies derived from the living matter as the result of its prolonged activity. These are at present merely known as "fatigue-toxins," and fatigue is therefore called toxæmia, which is only the Greek for blood-poisoning, but that these toxins have a definite, though possibly complex, chemical constitution is beyond the possibility of a doubt.

What is happening other than a chemical union between the cat and the chloroform when we end its earthly existence? It is purely a matter of organic chemistry; we have saturated the molecules of the living cat by means of those of the non-living chloroform to

such a degree that that manifestation of vitality, the cat's consciousness, has vanished. In other words, life can be chemically extinguished; and this is what is done every time there is poisoning by alcohol or the cyanides or perchlorides *et hoc genus omne*.

"Dutch courage" is a chemical affair; its basis, purely chemical and capable of being quantitatively estimated, is alluded to in the lines of Burns—

"Wi' tippeny we fear nae evil,
Wi' usequebagh we'd face the deevil."

When a person has become bad tempered through an attack of gout, or sleepy through an attack of jaundice, or sick from an attack of dyspepsia, or from having taken apomorphine, only a chemical explanation can be a complete one.

Now nothing is more familiar to the student of elementary chemistry than that heat facilitates and cold retards the activity of a chemical process, but it is equally well known to the student of elementary physiology that heat facilitates and cold retards the activity of a vital process. This does not indeed amount to a formal proof of the identity of life and chemical action, but it constitutes a high probability that they have something essential in common. When we make the remark that red-haired persons are usually irritable, we assert something that cannot mean that red hair in itself is the cause of bad temper. There must underlie both red hair and bad temper some one common antecedent chemical condition. That hair should be red instead of black or brown is a question of the chemistry of melanin; and the chemical peculiarity in the skin which is expressed as redness of hair must be intimately related to some other chemical peculiarity of the nervous system which expresses itself as irritability in the mental condition of the person in question. The absence of pigment from the skin and hairs of certain animals (albinos) is known to be associated with certain chemical peculiarities of their blood.

Or take the case of our sensations, always regarded as indubitable evidences of life. The vividness of these, even their very existence, can be made to depend on purely chemical conditions; the application of cocaine will abolish the sensation of pain, the chewing of *gymnema sylvestre* will abolish the taste of bitter things, while the taking of chloroform or of alcohol can modify or abolish certain sensations altogether. The toxins of fatigue have a distinct influence on the intensities of sensation, the tired person fails to perceive a certain phenomenon quite obvious to one whose nervous system is fresh.

The central proposition, however, is that bioplasm behaves essentially in the same fashion as a chemical substance does, that its activity is influenced by agents and agencies in the same manner as is a compound of high chemical instability. In support of this there is the noteworthy fact that living matter is constantly producing heat as the result of oxidations. This heat cannot have other than a chemical origin; it is indeed "vital" heat, but it is as truly chemical. It can be none other than the heat produced by the oxidation of carbon to carbon dioxide, of hydrogen to water, of sulphur to sulphuric acid, of phosphorus to phosphoric acid, all of which chemical substances we know to be constantly leaving the body. This animal heat is not physical; that is, it is not due to friction or to condensation of gas, but is as chemical as the heat set free when dilute sulphuric acid is poured upon zinc. Animal heat, so far from being, as the ancients thought, heat of an order entirely its own, is indistinguishable from heat of chemical origin. But if protoplasmic heat is of chemical origin, then the characteristic of life (evolution of heat) is a phenomenon within the realm of the laws of chemical activity. Indeed, Professor Rubner of Berlin, has shown that the animal body yields to a calorimeter in a given time almost exactly the same quantity of heat as would have been produced by the actual combustion of the food digested within that period.

Our next reason for believing that living matter behaves essentially as a chemical substance, is the way in which, as has been hinted, it is affected by a rise or fall of temperature. A fall of temperature depresses the energy of chemical unions, immobilizes molecules, makes all transformations of elements or of ions less easily accomplished; in a word, tends to create a condition of chemical inertness. Many chemical reactions and double decompositions which are suppressed altogether by a low temperature, are at ordinary temperatures quite feasible. Now protoplasm reacts towards cold in a precisely similar fashion. Cold depresses its activity, reduces the intensity of its energy-manifestations, immobilizes its molecules and generally inhibits its activity. This most familiar fact can only mean that vitality is lessened or suppressed because the molecular whirl of the living stuff has been profoundly interfered with or abolished. The muscles of our hands and face become "stiff with cold" because the chemical activities of the muscles are depressed by the cold, the molecules literally immobilised. The converse of all this is to be observed as regards heat. A rise of temperature accelerates the velocity of chemical reactions

and in many cases carefully studied, does so to the extent of doubling the velocity for each rise of ten degrees centigrade. Now all biologists know that precisely the same thing is true of protoplasm; its activities are not only accelerated by a rise of temperature, but, in a number of cases studied as to time-relations, the same law of doubled effect for a rise of ten degrees has been observed to be obeyed. All this looks exceedingly like heat acting on a chemical substance.

In confirmation of this mode of viewing living matter we have the special case of what has been well called latent life. In this state the chilled or dried bioplasm is *not* dead, for it can revive to activity on the temperature rising or on water being supplied to it, but neither is it alive, since it is exhibiting none of the evidences of vitality—evolution of heat, carbon dioxide, and water. It is merely capable of yielding once more these evidences of vitality, and it can exhibit a brief electric current on the reception of a brief electric stimulus (Waller's "last sign of life"). It is potentially but not actually alive. But this complete arrest of vital manifestations without death of the protoplasm can only be explained in terms that are chemical. It is the exact analogue of those chemical substances which have been cooled or dried to such a degree that they have become quite inert in a chemical sense. Chemists recognize chemical inertia, physiologists have been forced to recognize physiological inertia. It admits of no doubt whatever that a substance continually capable of eliminating water, carbon dioxide, sulphuric acid, phosphoric acid, and urea must be a chemical substance. Now protoplasm does actually eliminate these compounds. Tissue-respiration and the production of animal heat cannot have other than a chemical basis. Living matter behaves in a typically chemical fashion as regards its affinities for certain elements capable of coming into union with it. In the healthy state it has been shown, for instance, that it is impossible to oversaturate the tissue with oxygen, iron, arsenic, iodine, sodium, or any other element. There is a certain power of combining with these substances possessed by the tissues, and beyond that affinity-limit the bioplasm cannot be coerced into taking up any more oxygen, or iron, or arsenic, or iodine, or sodium, or any other element. This peculiarity is explicable only on the assumption that the substance protoplasm has a structure determined by those conditions which determine the properties of all substances which react *inter se*; namely, the combining-powers of the different species of matter endowed with chemical affinities. This fixedness of limit for saturation of pro-

toplasm by chemical substances explains the impossibility of indefinite increase in bulk of the nitrogenous tissues by over-feeding with nitrogenous food, of increasing the intensity of tissue-changes to any notable extent by the breathing of pure oxygen or of increasing, for instance, the iron- or phosphorus-content of the healthy red-marrow or brain. This possession of affinities for particular substances must be the explanation of the incorporation of drugs and poisons, and indeed of all food material itself: if this did not exist, no drug could be absorbed and no poison fixed in the tissues, which is only the chemical manner of saying that no drug could affect and no poison injure the body. Since poisons and food are absorbed, chemical affinity between the living matter and the food or drug is an absolute necessity. Researches are now being made, particularly by Dr. A. D. Waller, on the quantity of poisonous substance which can be fixed in a muscle in order to produce a definite result, for instance the abolition of its contraction. In this way, then, chemical substances are responsible for modifying or abolishing vitality.

But again, we have been forced to recognize a particular type of sleep as that of auto-intoxication by soluble substances alluded to provisionally as "fatigue-toxins": this type is often and quite properly described as sleep of *chemical* origin. It is the chemical effect on the brain-cells related to consciousness of substances produced by previous tissue-activity. In order to influence the brain-cells these toxins must for a time be chemically incorporated with the cerebral molecules, conceivably as "side-chains" (Ehrlich), and subsequently be subjected to oxidative elimination during sleep. It has for some time been recognized that bodily fatigue is chemical; the fatigue factor in sleep is necessarily no less so.

The objective aspect of fatigue in the nervous system has been minutely studied of late years, with the result that certain phosphorus-containing granules in the nerve-cells have been identified as the material basis of the energy production. When these granules are of a certain contour, recognized as "normal," the cells are fresh or "fit" in common parlance, able to discharge their nerve-energy (neurine); in exhausted states the granules are visibly altered, shrunken, etc. It is their chemically complex constitution that enables them to be the seats of dynamogenesis, apparently nothing chemically simpler than this kinetoplasm would suffice.

That tissues habitually act chemically is recognized in the expression quite familiar to all physiologists since the time of Claude Bernard—"chemical tone." This is only a more definite

expression than "tissue tone," and it denotes that state of well-being of the tissues when each one is doing its duty in the best, that is in the most economical, way possible. The secreting gland-cells are in chemical tone when, supplied with the necessary amount of blood but no more, they manufacture aright their ferments and other secretions and send them with the proper amount of force towards the ducts, while they give to the lymph certain waste substances not needed by the cells and indeed deleterious to them if retained. Possibly the term "chemical tone" has arisen because in muscle there is a physical tone as well as a chemical, or rather the tone of muscle is capable of a double expression—(1) a certain tension of the fibres (incipient contraction) and evolution of heat which may be called the factors in physical tone, and (2) a certain state of chemical fitness or chemical tone shown by the evolution of carbon dioxide. Flabbiness is due to a loss of physical tone, chilliness and diminished excretion of carbon dioxide are due to the loss of chemical tone. The supposition that both sorts of tone are maintained by innervation, though an extremely interesting topic, does not enter into our present subject.

It is due to the discoveries in biochemistry of the last few years that we regard tissue-tone as dependent on the well-being of, it may be, quite distant organs. Thus, there is no doubt that muscle-tone is maintained by a chemical substance manufactured by the apparently insignificant suprarenal capsules. If they are diseased or extirpated the heart becomes notably weaker and the body muscles reduced in tonicity: this action is said to be carried out by an "internal secretion." Similarly, it has been demonstrated that the thyroid gland has a distinct influence on the skin and nervous system, the most debilitating condition known as myxoedema being produced when this comparatively small gland is diseased. Other still smaller glands have equally important controlling powers, the pituitary, as it is called, at the base of the brain, controls bone-formation in such a way that if it is diseased in early life the person grows up to be a giant. The profound influence exerted on the whole organism by the development of the sex glands is so familiar a fact in physiology that it need not be more than mentioned here.

The differences in chemical constitution of the different tissues must be the reason why, for instance, in the child the growing bone absorbs more lime than does any other tissue, the nervous system more phosphorus, the blood-corpuscles more potassium and iron, the cartilages more sodium, and so on: each tissue must possess selective affinities in order that the precise chemical structure should

not become a merely haphazard occurrence. Further, the potassium of blood-corpuscles cannot be replaced by sodium or lime indifferently; not only the same elements must remain in the tissues in order that they be in health, but precisely the same percentage of them, each for each. Professor Loeb, of Chicago, and many before him and after him, have shown that most minute changes in the concentration of the inorganic salts, the ions, bathing the various living tissues affect the health of these tissues in what would appear a quite disproportionate fashion. Certain marine eggs will not develop properly if immersed in a solution of salts differing only exceedingly slightly from normal sea water. Monsters and aberrant forms in the case of the simpler aquatic creatures can be artificially produced by thus tampering with the chemical constitution of the saline nutrient media for the eggs.

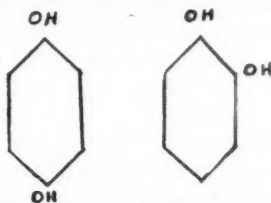
Certain diseased conditions seem related in some little understood fashion to the chemical constitution of tissues. Scurvy is due to a deficient absorption of potassium, rickets to that of calcium, a form of anæmia to that of iron, all chemical aberrations: gout and all that flows from it, is very largely an affair of the insufficient excretion or the over-production of sodium and calcium urate. Why there should be deficient absorption and deficient excretion, respectively, must be susceptible of only a chemical explanation. In gastric cancer there is deficient excretion of hydrochloric acid. It is very familiar that certain diseases have favourite seats of attack, the toxin of diphtheria, for instance, selects the muscles of the palate, of tetanus certain cell-groups in the nervous system, of hydrophobia certain other cell-groups in the nervous system, the poison of syphilis has a distinct predilection for the bones, the skin, and the central nervous system; the reason for these selective affinities must be ultimately a chemical one.

Similarly the most curious tendencies for certain drugs and poisons, both mineral and vegetable, to be absorbed by certain tissues—digitalis by heart-muscle, arsenic by bone-marrow and skin, strychnin by cells of the central nervous system, atropin by nerve-endings, nicotin by motor nerve-endings, chloroform by the cells related to consciousness,—must have an explanation that is wholly chemical: every day we are getting nearer to what it is.

The aberrant metabolism of calcium in old age with increase of it in the rib cartilages, in the larynx, and in the walls of arteries, as also the silting up of the membrana tympani with calcic salts is a chemical affair.

To pass to totally different examples: the realm of the sensa-

tions affords us several examples of the dependence of life on chemical conditions. Allusion has already been made to the modification of sensations by means of the presence of fatigue, drugs, and diseased conditions, but there is a department of the physiology of the senses devoted to the study of a relationship between the sensations and the chemical configuration of sensation-arousing substances. Thus, many years ago, Professor Haycraft of Cardiff, pointed out that if one arranged certain substances in order of their atomic weights, it was possible to show that their smell-producing and taste-producing powers were a function of their atomic weights. He demonstrated that the presence or absence of an atom of carbon or of hydrogen made considerable difference to the odour or taste of the bodies under examination. Since the date of this paper, a good deal of observation has been made on similar lines, and it is now known that, for instance, the mere position, whether symmetrical or not, of the hydroxyl groups in the benzene ring, determines the sweetness or bitterness of a compound, thus:—



the former being the bitter quinol, the latter the sweet catechol.

There is not much difference chemically between these two bodies, and what there is is entirely stereochemical, but the sweet and bitter-perceiving end-organs are evidently perfectly pre-adapted to be affected differently by the extremely slight alteration in the relative place of the side-chain.

We have evidence that such lowly living creatures as the fungi are exceedingly susceptible to such infinitesimal differences as those between a substance and its isomer. Certain sugars, able to be fermented by certain yeasts, are quite unable to be attacked by other but closely allied yeasts. Or again, a given yeast will readily ferment a sugar while totally unable to deal with another sugar of precisely the same percentage composition, but differing from the former only in having its hydroxyl groups relatively differently arranged in the chain.

Chemical constitution, nay, the possession of the element phosphorus, is an important factor in a subject so difficult of com-

prehension as heredity. Biologists seem to be in no doubt that the substance concerned in the transmission from parent to offspring of the potentialities of certain physical and psychical attributes is what the morphologists call chromatin, the chemists nucleoprotein. A high percentage of phosphorus is a characteristic of nucleoprotein, so that it is literally true that our existence chemically depends on the phosphorus of this absolutely microscopic substance. The fusion of the female nucleus with the male nucleus or sperm must depend on certain mutual chemical affinities operative whenever these two complementally endowed portions of living matter are enabled to come within a certain distance of each other.

But if this much be admitted, then it must follow that the congenital differences and the inherited peculiarities which distinguish the one sex from the other and one social stratum from the other, are, in ultimate analysis, based on chemical differences. There are no discernible differences between the physical organs and tissues of the coal-heaver and the sovereign; but it is inconceivable that there is not some real, specific, though undiscoverable, difference in the ultimate *chemical* constitution of the living matter of the two men, enough chemical difference to account for that comparatively small difference in their social behaviour which is denoted by the word "breeding."

While undoubtedly Huxley was right in teaching at the time he did that life had a physical basis, it seems to me interesting, if not as important, to realize that it also and as truly has a chemical one. While I have thus emphasized, it may be thought unduly, the resemblances between living matter and non-living substances capable of exhibiting chemical activity, and while I believe that the same laws govern the behaviour of carbon, and hydrogen, and oxygen, whether they are in living muscle or in dead muscle, or in sugar or in gunpowder, yet I should regret it exceedingly if I were understood to support the crude generalization that the realms of life and of chemical phenomena are indistinguishable and co-extensive. Far be it from me to suggest that the crucibles and condensers of our chemical laboratories contain the secret of the mystery of vitality or of consciousness.

LUETIC CIRRHOSIS OF THE LIVER

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THE complex interaction of morbid processes in the viscera related to the upper gastro-intestinal tract is exemplified by many cases of cirrhosis of the liver, as met with at autopsy. Even after death, such cases always present problems which are of interest to the clinician who seeks better indications for diagnosis, prognosis, or treatment.

The following case furnishes a striking example of difficulties of this kind, where histological evidence alone furnished a clue to the real nature of the disease. A recital of the details observed during life, as well as at autopsy, may be of use in the detection of similar cases, besides possessing the additional value of illustrating some of the effects which tertiary syphilis, under certain circumstances, may produce on both liver and stomach.

P. S. S., male, aged forty-three years, following the occupation of a clerk, and married, came to the hospital for treatment for diarrhoea, pain in the stomach, and abdominal distension. The symptoms commenced three years previously, there being dull, steady pain in the epigastrium, which came on about fifteen minutes after eating and lasted an hour or two. Occasionally three or four days would pass by without any pain, but there were constant signs of distress in the gastric region and occasional diarrhoea. Eighteen months ago, the abdomen began to enlarge, and the weight and strength to diminish. There was never any jaundice. The symptoms complained of had been worse during the last six months. He admitted taking a small quantity of spirits regularly, but denied venereal disease. He had been married for sixteen years, and one child had died of diabetes, but the other was alive and well. His wife had had no miscarriages.

On admission, the patient was noted to be poorly nourished. The sclerotics were slightly yellow. There was no dyspnoea or cyanosis or mental disturbance. Temperature normal. Pulse 80. Respirations 20. There was no oedema and no scars could be found. His superficial lymphatic glands were distinctly palpable. His arteries were thickened and his blood-pressure was high. The

abdomen was markedly distended, the flanks bulging, and a reducible umbilical hernia present. The superficial abdominal veins were prominent. In the left upper quadrant of his abdomen was a hard nodular mass whose outlines were rather indefinite. It extended forwards as far as the ninth costal cartilage, and was palpable two inches below the costal margin. It moved with respiration and was slightly tender to pressure. It was not ascertained whether this was splenic or hepatic, but there was no evidence of enlargement of the liver on the right side. The right testicle was the size of an egg, hard and finely nodular; testicular sensation was present. Nervous system normal. Urine and stools normal. Blood: red cells 4,240,000, white cells 5,400, and 60 per cent. hæmoglobin. A differential leucocytic count showed 80 per cent. polymorpho leucocytes, 7 per cent. small leucocytes, 12 per cent. large mononuclears, and 1.5 per cent. mast cells.

PROGRESS IN HOSPITAL: Eighteen days after admission 218 ounces of clear, straw-coloured fluid were withdrawn from the abdomen. It was alkaline in reaction, very rich in albumin and contained no blood or pus cells. Two weeks later 290 ounces more were withdrawn. There were severe attacks of diarrhoea alternating with constipation. There was steady loss of strength, especially during the last three weeks of life. There were symptoms of peritonitis during the twenty-four hours preceding death, which occurred four and a half weeks after admission.

The autopsy was performed four hours after death, and the following account is abstracted from the report: The body is that of a poorly nourished male, 170 cm. in length, and apparently fifty years old. Hair, dark brown, turning grey, bald on top of head. The pupils were equal. Abdomen greatly distended. Skin shiny. External genitals cedematous.

The thoracic organs were displaced upwards. There was no fluid present, but some adhesions were found at the base of the lungs. The lungs showed some hypostatic congestion. The trachea and bronchi were also congested. The diaphragmatic pleura was thickened on both sides.

The pericardial cavity contained a small amount of clear fluid. The parietal and visceral pericardium showed numerous, small, flame-shaped hæmorrhagic areas at the base and around the side of the left ventricle. The heart was dilated and slightly hypertrophied, weighing 325 gms. Apart from a slight fatty atheromatous change, the aorta and its large branches were normal.

The abdomen was completely filled with turbid yellow fluid.


The transverse colon was found greatly distended. The peritoneum was rough, granular, and showed recent purulent lymph. The great omentum was covered with purulent lymph and was adherent to the coils of small intestines which were intensely congested. The upper limit of the right cupola of the diaphragm was at the level of the lower border of the third rib. The mesenteric glands were not enlarged.

LIVER: The liver was greatly enlarged, especially on the left side. On the right side the liver was extremely adherent to the diaphragm by firm, vascularized adhesions. Weight, 2,875 gms. The surface of the liver was very irregular, lobulated in some places, puckered in others, and the right lobe was irregularly opaque, the greatest opacities being in the furrows; radiating lines of opacity extended from them. There was much thickening about the gall bladder. The cavity of the gall bladder was small, and contained only a few drops of yellowish green bile. The bile ducts were patent. The portal vein was occupied along its whole length by a bright red, partly adherent thrombus, the adhesions being along its anterior wall. A clear passage-way existed behind this thrombus. The splenic vein was normal, but at the junction of the splenic with the superior mesenteric the thrombus projected slightly into it. The cut surface of the liver showed some small, rounded, nodular areas about 1.5 cm. in diameter, near the upper surface, and the tissue surrounding them was pale and fibrous. The nodules showed creamy yellow centres and a pale yellow sinous contour. Four other smaller nodules were found in the middle of the liver. The liver substance was firm, and there was an increase in connective tissue. The blood vessels were empty. The lobules were congested. A few small areas of hæmorrhagic extravasation into the interstitial tissue were also observed. The track of the portal veins was extremely fibrosed and radiating contractions of the liver substance occurred throughout in this situation.

HISTOLOGICAL EXAMINATION OF LIVER NODULE: The nodule consists of degenerated matter enclosed by dense, fibrous, connective tissue, infiltrated by inflammatory cells, chiefly lymphocytes, polymorphonuclear leucocytes, and a few eosinophiles. A few feebly staining nuclei are scattered through the necrotic mass. The liver tissue in the vicinity is compressed and laminated. Diagnosis: Gumma of liver.

Sections of the liver tissue show the capsule thickened and markedly infiltrated with chronic inflammatory cells. The connective tissue is increased to a variable extent, being particularly marked

about the portal systems, and sometimes separates individual lobules from one another, sometimes encloses groups of lobules, which on the whole are small and poorly defined. The intralobular veins are dilated. Bile pigmentation is scanty in the liver cells; a few areas of circumscribed necrosis are seen in a few lobules and a slight amount of fat infiltration is also present in a few places. The liver cells nearest the central vessel are large, deeply staining, and contain oval nuclei; in the mesial and peripheral zones of the lobules the cells are more irregular in appearance, the nuclei numerous and some show mitotic figures. Tracts of inflammatory cells were seen here and there, chiefly along the course of the larger blood vessels. In places they were collected into groups. In a few areas small hæmorrhages are seen. A few sections showed recent thrombi in the smaller branches of the portal vein.

 **SPLEEN:** The spleen was removed with some difficulty, being adherent to the surrounding tissues. The capsule was opaque and tense, pale purple in colour. The organ was flabby, the cut surface pale red, and the Malpighian bodies indistinct. The connective tissue was not apparently increased. Weight, 1,000 gms.

Sections of spleen tissue show the capsule much thickened and its deeper layers consist of sclerosing, chronic, inflammatory tissue, the bands of which become continuous with the thickened fibrous trabeculæ of the splenic substance. Tortuous vessels traverse the trabeculæ and occasionally old hæmorrhages have taken place along their length, with very marked phagocytosis of the extravasated pigment. The Malpighian bodies are few in number, small in size, and fairly well-defined. The walls of the central vessels are rather thickened and the reticulum of the bodies is frequently seen to be unduly fibrous. The germ centre cells do not show active mitosis, and the peripheral zone of lymphocytes is reduced in size, numerous plasma cells occurring within it. The pulp sinuses are dilated and engorged. Desquamation of their lining epithelium is occasionally observed. Eosinophiles and polymorphonuclears are rarely seen. There is a hyaline change in the reticula of the pulp cords, and many of them are replaced by an excess of fibrous, connective tissue. Diagnosis: Perisplenitis; excessive fibrosis; old hæmorrhage; atrophy of pulp tissue.

The stomach measured 23.5 x 8.5 cm. The walls were pale purple in colour, the rugæ very faintly marked and numerous punctiform ecchymoses were present round the greater curvature. The pyloric ring was well marked. About the middle of its greater curvature the stomach was adherent to the liver and the mucosa at

this spot showed an irregular ulcerated area 6 x 6 cm. with a polypoid surface and surroundings of pale colour. The walls of the stomach were thickened, particularly at this spot, being almost cartilaginous in consistence. A nodule similar to those in the liver was found closely adherent to the outer wall.

Histological examination of gastric ulcer: The mucosa is, for the most part, degenerated, and the lining epithelium is desquamated, and the glands appear as small, irregular tubules whose lining walls have nearly all been shed. The inter-glandular tissue shows much infiltration and the blood vessels are dilated. The cells are chiefly lymphoid. In one place it is completely lost, the submucosa forming the base of a shallow ulcer. In one or two places small hæmorrhages occur. The submucosa is much increased in thickness, its stroma being composed of very dense, fibrous tissue supporting numerous thick-walled blood vessels, around which are dense collections of round cells. The muscular coats are infiltrated slightly and the blood vessels congested. The serosa is also thickened. Diagnosis: Chronic interstitial gastritis; gastric ulcer (probably luetic).

The duodenum, save for a few punctiform hæmorrhages seen in the serosa, was normal.

The small intestine was 4.5 cm. in circumference. Its walls were oedematous and passively congested. Contents scanty and pale yellow in colour. There were no enlarged follicles, no hæmorrhages. A small Meckel's diverticulum was present 60 cm. from the ileo-cæcal valve.

Histological examination of wall of small intestine: The mucosa is practically absent. The villi are degenerated and only show in a few places. The glands are very scanty, with desquamation of the epithelium in places. The inter-glandular tissue is very fibrous, and in places shows small, round-celled infiltration. The muscularis mucosæ is shown as an irregular band. The submucosa is much increased in thickness and fibrosed. The blood vessels are thickened and congested. The muscular coat shows extensive fibrosis, while the serosa is thickened and shows a beginning fibrous change.

The appendix was 6.5 cm. in length. Its walls were thickened and the mucosa intensely congested. Small hæmorrhages were seen in the mucosa. The contents were pale yellow.

The large intestine, except for considerable passive congestion and slight oedema, showed no abnormality.

Microscopically the right testicle showed an increase in fibrous connective tissue. There were no areas of necrosis.

ANATOMICAL DIAGNOSIS: Unilobular, megasplenic cirrhosis hepatitis, and multiple gummata; chronic pericholecystitis; chronic pancreatitis; chronic peripancreatitis; thrombosis of the portal vein; atypical ulceration of the stomach with polyposis; secondary deposits in pyloric and lumbar glands; extreme ascites; early suppurative peritonitis (general); chronic adhesive pleurisy (right base and left, universal); right pleural effusion; hypostatic pneumonia; bronchitis; hæmorrhages of pericardium; dilated right auricle and right ventricle; chronic adhesive perihepatitis; chronic adhesive perisplenitis; giant spleen; subdiaphragmatic abscess (right); subacute hæmorrhagic appendicitis; passive congestion of the alimentary tract; chronic tubal nephritis with passive congestion; fibrosis of testicle.

The case which is outlined above presents the following interesting features which are worthy of comment:

The nature of the changes in the stomach: The superficial ulceration found at the autopsy was evidently the cause of the first symptoms recorded in the patient's illness. It is debatable whether this condition can be looked upon as of primary origin, or whether it was a secondary event in the course of the generalized fibrotic change discovered throughout the stomach. Lesions of this nature are of great interest, not only from the point of view of their causation, but also from their resemblance to sarcoma when they occur unaccompanied by pathological lesions elsewhere. Superficial ulcerations of the stomach mucosa, although comparatively rare, have been recorded as occurring in cases of cirrhosis of the liver as a result of the stagnation of the blood current from portal obstruction. This can hardly be the explanation in this case, for here was a very large ulcer with a firm, almost cartilaginous, border. It is probable that this ulcer was even more extensive at the time when the patient's attention was first directed to his stomach three years ago. Apart from ulceration, microscopic changes similar to those found in the stomach were also seen in the small intestine, and would account for the troublesome diarrhœa.

The condition of the liver: The changes in the liver were very marked. There was the great deformity already noted; an explanation of the atrophy of the right lobe might be sought in the partially thrombosed portal vein. It has been suggested that the blood current in the portal vein is largely double, the current from the splenic vein being directed more towards the left lobe of the liver, whilst that from the superior mesenteric goes more to the right, although some commingling of the streams must be admitted.

This case lends support to the view, in that the right lobe showed signs of feeble blood supply, with a thrombosed superior mesenteric, while in a case that came to autopsy recently at the Royal Victoria Hospital where an abscess in the spleen produced thrombosis of the *splenic* vein, atrophy of the *left* lobe of the liver was noted in the autopsy findings. In the case under consideration the thrombosis would also have the effect of diverting the blood more towards the left lobe and would cause it to hypertrophy to the immense size observed. As to the causation of the partial thrombus, many conjectures might be hazarded: a low grade infection from the intestinal tract, pressure from the marked ascites, changes in the overlying serosa, or very probably a stagnation of the current in the veins from the delayed circulation in the liver may have all contributed to its production. Rolleston remarks that portal thrombosis in cases of cirrhosis of the liver is far from common. Judging from the histological sections made from the portal vein in this case, the thrombus, whilst not of any recent origin, was not old enough to be considered the entire cause of the ascites, although it doubtlessly contributed considerably during the last few weeks of life.

Apart from these changes the liver presented other pronounced pathological lesions, (a) a number of round, soft-centred nodules surrounded by puckered tissue, (b) a great increase in the amount of fibrous, connective tissue. Concerning the nodules found, they were doubtlessly gummata. There was no evidence of actinomycosis or tubercle either in structure or by discovery of an organism. Furthermore, the distribution of the nodules and the appearance of the tissue about them was rather characteristic. That they were there for some time was evident from their degenerated centres and from the dense arrangement of the fibrous tissue about them. The distribution of the fibrous tissue was also suggestive, extending as it did in dense, radiating bands, particularly over the diaphragmatic surface and in the neighbourhood of the round ligament. It was also present in some quantity about the track of the large portal branches, and spread irregularly into the organ, producing large, scarred areas of liver tissue. The microscopic findings show extensive changes in all parts of the liver, so that the functions of the gland must have been markedly interfered with.

The condition of the spleen: The spleen in this case was about eight times larger than normal. Splenic enlargement is usually greater in biliary than in portal cirrhosis. Two main theories are usually advanced to account for the great size of the organ in cases of portal cirrhosis, (1) mechanical from backward pressure, and (2)

toxæmic, i.e., circulating poisons reaching the spleen through the splenic artery. Rolleston says "that the enlargement of the spleen in such cases is primarily due to toxic action and is aided by increased venous pressure in the portal system." The degree of splenic enlargement in cases of cirrhosis has been looked upon by many clinicians as an index to the changes in the liver; this statement is borne out by the present case. However, the clinical detection of rapid enlargement of the organ is often impossible, owing to tympanites or ascites. The possibility that the marked enlargement of the spleen may have been due to primary disease in that organ requires brief notice. The dilatation of the splenic channels with increased fibrous, connective tissue throughout is a feature also met with in some forms of Banti's disease. In some cases of this disease, the spleen does not necessarily attain the size seen in our case, and in them syphilitic findings have also been described. Our chief reasons for regarding the changes in the spleen in this case as secondary to the liver are: (1) The flabby appearance of the organ at autopsy with no increase of connective tissue as seen by the naked eye; (2) the much greater degree of fibrotic change (both megascopically and microscopically) in the liver; (3) the fact that the onset of clinical signs as well as the duration of the disease in this case are not in accord with what is usually described in Banti's disease. On the other hand, spleens of this size are the exception, rather than the rule, in cases of hepatic cirrhosis with portal obstruction.

Pancreas: The pancreatic changes were part of the widespread alimentary lesions recorded.

Ascites: The ascites which occurs in portal cirrhosis is usually ascribed to the mechanical effects of the increased fibrous tissue. Rolleston believes that it is due to the effect of poisons, which the hepatic inefficacy is unable to prevent from circulating, "having a lymphagogue action and therefore inducing an exaggerated flow of fluid into the peritoneal cavity." In this case there were a number of factors, each able to bring about marked ascites; the increased fibrous change, especially round the gummata, in the liver, a perihepatitis, partial thrombosis of the portal vein, chronic peritonitis, and towards the end a failing heart; so that it is impossible to say with any accuracy the part played by any one of these factors in this connexion. Undoubtedly it was caused in the earlier stage of the disease by the liver changes along with the chronic peritonitis, and towards the end the portal thrombosis and failing heart contributed. The dense, vascularized adhesions existing between liver and diaphragm and about the spleen are indica-

tions that some of the blood from the congested portal area was diverted by these routes into the general circulation. They were compensatory in action.

The recent peritonitis with small, sub-diaphragmatic abscess found at autopsy was most likely due to the tapping and the greatly lowered resistance of the patient. The favourable ascitic culture medium greatly facilitated the growth of any organism accidentally introduced.

FROM Indian Head and Rosser come reports of an epidemic of scarlet fever. At the former place five deaths occurred within a few days, and all public places like schools and churches were ordered to be closed by the provincial board of health.

It might fairly be said that smallpox is prevalent in the province of Quebec. As long ago as July twenty cases were reported, and by January the number had increased to fifty-six. These figures give no indication whatever as to the prevalence of the disease, and the latest returns show that there are one or more cases in fifty-six separate municipalities. From far-away Athabaska Landing comes a report of an outbreak there, where an hotel had to be closed for fumigation and the inmates vaccinated.

A SERIOUS charge is brought against the town of Sarnia by the *Lindsay Watchman-Warder*. According to this newspaper, Sarnia has been suffering from an epidemic of typhoid which it is said might have been prevented but for the suppression of the report revealing the danger. The excuse given for concealing the facts was the fear that the business of the town might be affected. From the *Chatham News* it appears that Dr. McCullough, the health officer of the province, has been conducting an inquiry into the cause of the epidemic. It seems that during the past year one hundred and sixty cases of typhoid have been reported, and twenty witnesses were examined upon the subject. One witness affirmed that a break in the intake pipe has been allowing infected water to enter the town for the last two years.

ON THE AMMONIA COEFFICIENT IN A CASE OF SEVERE VOMITING IN PREGNANCY

BY A. W. M. ELLIS, M.B.

From the Department of Pathological Chemistry in the University of Toronto

IT was contended by Williams in 1906 (Johns Hopkins Bulletin), on the strength of four cases of severe vomiting in pregnancy, that, whenever the amount of ammonia in the urine of such cases amounts to more than 10 per cent. of the whole nitrogen excreted, the pregnancy should be artificially terminated. For, according to his view, such a condition indicates a toxæmia likely to lead to a fatal issue with symptoms resembling acute yellow atrophy of the liver.

By the kindness of Dr. Graham Chambers, under whose care at the Toronto General Hospital the patient to be referred to was, in consultation with Dr. McIlwraith, successfully treated, I had the opportunity of examining the urine in a case of severe vomiting in pregnancy similar to those cases referred to by Williams. The clinical features of the case are given in the following account, which is from the notes kindly furnished by Dr. Lowrie, who was at the time interne at the General Hospital:

Mrs. H., aged twenty-eight, admitted October 21st, 1910, was married a year ago. Menstruation, previously regular, ceased three months ago. Nausea and vomiting, at first only on rising in the morning, persisted for six weeks, gradually becoming more severe till in the week before admission even water produced the attacks, and rectal feeding had to be resorted to. On admission, the patient, who seemed fairly nourished, had a dry tongue with brown coating, the abdomen was hypersensitive on palpation, and the bowels constipated. The smell of acetone was noticed in the breath, and the vomitus, which was almost neutral in reaction, gave the tests for acetone. Absolute rest was prescribed and all visitors excluded. As it was found that even sips of water started the vomiting, nothing was given by the mouth, and rectal feeding alone relied upon. Three nutrient enemata, each containing an egg, 5 ounces of peptonized milk, half an ounce of glucose, and 20 grains of salt, and four saline enemata of 8 ounces each were given daily.

After three days sips of malted milk were at first partly retained, but soon the vomiting returned more severely and feeding by the mouth had to be entirely given up. Four days later another attempt to administer small quantities of milk and oyster broth by the mouth was similarly only for a short time successful. Finally, only after ten days in hospital it began to be possible to give, without causing vomiting, small but gradually increasing amounts of food, and so at the end of another week (November 7th) to reduce the enemata to one a day. On November 9th, a slight, transient cystitis developed which was treated and cured in two days. The patient was by that time able to take poached eggs and toast, and improved thenceforward steadily, so as on discharge (November 18th) to be able to take any light food. Five and a half months later the patient was delivered of a normal, healthy, full-term child.

On admission into the hospital in October the urine was found to contain no sugar or albumin, but gave the reactions for acetone and diacetic acid strongly. On October 26th, in a sample of the urine, the ammonia was estimated by the formalin titration method, the total nitrogen by Kjeldahl's method, and the former found to amount to 32 per cent. of the latter. From that time on the urine was collected, as far as possible, completely, and the results of my analyses are contained in the table on page 110.

The figures given show that the ammonia coefficient throughout the period from October 26th, when it was first examined, till November 7th, was always found to be considerably higher than the limit of safety as defined by Williams, and on November 3rd an intense acidosis was evident. But there was no vomiting after November 1st, and on November 5th, when the amount of ammonia was still undiminished, the patient was obviously very much better and was able to retain increasing quantities of food. Even so, she was of course receiving far short of the physiological amount of energy in her food, and therefore the high ammonia coefficients would appear to have been determined rather by this fact than by any such toxæmia as that inferred to exist in all such cases by Williams. That prolonged vomiting in infants may result in still higher ammonia coefficients is well known from the reports of Czerny and Keller, and the highest recorded figure is in a case of hysterical abstinence (70 per cent.) given by Nebelthau.

The doctrine, therefore, that in the vomiting of pregnancy, if the ammonia coefficient rises above 10 or 15 per cent., abortion should be resorted to, is to be abandoned.

Date	Volume in c.c.	passed in hours	Total nitrogen	Nitrogen as ammonia	Coefficient	Acetone	Diacetic acid
Oct. 27	100	8	g. 0.49	g. 0.145	29.4	++	++
" 28	875	24	3.24	0.659	20.5	0.28g.	1.39g.
Nov. 1	725	24	2.82	0.832	29.9	{ Oxybutyric acid ++	3.56g. ++
" 3	1180	48	3.76 (in 24 ^h)	1.54	37.5		
" 4	865	20	5.78	1.78	31.0	++	++
" 5	985	24	3.93	1.39	36.3	++	++
" 7	1140	27	5.38	1.40	25.9	++	++
" 8	930	24	8.79	0.90	10.4	++	+
" 9	1120	24	4.70	0.65	13.8	+	0
" 16	0.63%	0.112%	17.8	—	—

The total nitrogen was estimated by the Kjeldahl method, the ammonia always by the formalin method, controlled in certain instances by Folin's method; the differences between the results by these two methods were not such as to indicate any further abnormality in the partition of the excreted nitrogen. All the specimens of urine were acid except that of November 9th.

ANGIOMA OF THE LARYNX

BY G. STERLING RYERSON, M.D., C.M., L.R.C.S., EDIN.

ANGIOMA of the larynx is a very rare affection. In a private and hospital practice of over thirty years I have seen but the one case, the history of which I am about to relate. Solis Cohen states in his text-book that he has not seen any case. Fauvel reports one; Morrell Mackenzie, one; Elsberg, one; Shurly, one; Frankel, two; and Heinze, one. No doubt there are more to be found if one spent the time necessary searching the literature, but enough has been said to show the rarity of these cases.

Histologically, the cavernated tissue in angioma is lined with a single layer of epitheloid cells. The vascular spaces may be empty or filled with laminated clots. The surface partakes of the epithelium of the part. The stroma may undergo mucoid degeneration, giving the growth a mixed character.

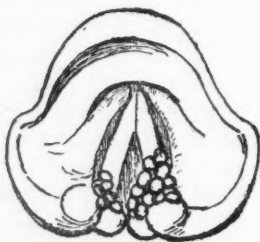
Angioma cavernosa presents the appearance of a raspberry-like mass and may be either sessile or pedunculated. It may appear in any part of the larynx, but is most common on the vocal cords. The treatment which has hitherto been used has been galvano-cautery, or crushing with forceps, often with disastrous results.

St. Clair Thompson relates a case which had been seen by Morrell Mackenzie and others, in which many attempts had been made to treat the patient with galvano-cautery with unfortunate results. A case was shown by C. J. Symonds at the section of Laryngology, Royal Society of Medicine, in 1905. Sir Felix Semon saw the case, and said that it was a very rare condition and advised leaving it alone. In Shurly's case tracheotomy was done to relieve dyspnoea. The growth entirely encircled the lower laryngeal and upper tracheal region. In opening the trachea the growth was incised, which gave rise to uncontrollable hæmorrhage, which resulted in the death of the patient. Ferreri reports a case of angioma of the size of a walnut on the lower portion of the left vocal cord. It was crushed with a forceps. Alarming hæmorrhage took place, and the patient died forty-eight hours later with infective pneumonia. W. G. Gibson reports the case of a cavernous angioma

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of anterior portion of left vocal cord of the size of a pea. It was removed with forceps and cauterized. There was very little bleeding. It will be seen, therefore, that the removal by cautery or surgical methods of a laryngeal angioma is accompanied by a real and serious danger of hæmorrhage.

It was after a study of the literature of these cases of angioma of the larynx that I determined to try radium, which has led to my giving attention to radium therapy on a larger scale.



The following is a brief account of my case. A lady aged fifty-five, single, was sent to me by Dr. Kerr, of Elora, May 6th, 1909. She complained of difficulty and oppression of breathing at times, but with no pain, hoarseness, or cough. No family history of growth or tumours. Her mother had "thick neck" and died of heart failure at an advanced age. Her present difficulty began about a year before with stiffness and pain in the tongue and occasional difficulty in breathing. She said some enlarged veins at the back of the tongue had been burnt off. She had no difficulty in swallowing. An examination of the larynx showed on the left side on the anterior surface of the arytenoid, on the ventricular band and along the external margin of the vocal cord, a bluish purple mass lobulated and presenting the appearance of a small raspberry. On the anterior surface of the right arytenoid was another similar body, but smaller, which did extend beyond the arytenoid. The accompanying drawing gives a fair but somewhat exaggerated idea of the appearance of the growth. In view of the disastrous effects of operative interference, I determined to try radium, and obtained from Dr. E. E. King a tube of German radium of unknown activity. With Dr. King's assistance an applicator was devised and treatment begun. Meanwhile, I communicated with Dr. Wickham, in Paris, who advised a special applicator furnished with three mg. radium, activity 1,000,000. This was obtained in due course and treatments

continued, at intervals of three months, for a year. At the end of that time there was a considerable improvement, but much of the mass still remained. I then obtained a small disc containing 10 mg. of radium, activity 500,000, and had an applicator made so that it could be introduced into the larynx. I continued the treatment with the former intervals, when a marked improvement was soon noticeable. By April, 1911, it had disappeared, except a small point which I thought I could venture to cauterize with electrocautery without danger. I did so, and to-day where formerly there were two vascular growths there are two small cicatricial nodules.

REMARKS. 1. The time taken in the cure of this case would have been reduced at least fifty per cent. if I had had the requisite appliances at the outset and had had the experience which I now possess. This was my first personal experience of radium treatment.

2. A great difficulty was the impossibility of retaining the applicator in place longer than three minutes at a time, and more generally one minute, in spite of liberal cocaineization.

3. I have found that angioma and nævi resist radium in direct ratio with the age, the older the subject the greater the resistance. This no doubt applies to the mucous membrane as well as the skin.

4. This patient had also a small goitre. I could not make out that it bore any direct relation to the throat lesion.

A writer has remarked that patients with angioma of the larynx suffer from time to time from cedema of the larynx, which would explain the attacks of difficulty of breathing.

At the mid-winter session of the Valley Medical Society, held at Bridgetown, an address was presented to Dr. L. G. De Blois, a graduate of the year 1861, in honour of his having passed his fiftieth year in the practice of medicine. Amongst the signatories to the address were Drs. Sponagle, Connor, DeWitt, Morris, More, McKinnon, Balcom, Reid, Morse, McDonald, and Young.

BIOLOGICAL PRODUCTS

BY CHARLES H. HIGGINS, D.V.S., F.R.M.S.

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THE title of my paper confronts us with a large variety of preparations, some of which have secured an enviable reputation in the diagnosis, prevention, and treatment of disease; many are undergoing the evolutionary period, a few of which will eventually be discarded, while others have been wholly unable to survive the vicissitudes of either practical or theoretical experimentation.

It is not my purpose to mention individual products and indicate the results, beneficial or otherwise, following their use in the diagnosis, prevention, or treatment of diseased conditions. My effort, however, will be directed to the consideration of certain of the more important problems associated with their history and manufacture. The special indications for their use, the methods of application, dosage, and the results obtained therefrom, naturally belong to the clinician, although their origin and the technicalities surrounding their preparation are usually the result of detailed laboratory study.

I desire to premise my remarks by the statement that the development of my theme will be from the very broad standpoint of preventive medicine as related to public health problems, and will, in a general way, include all biological products, whether the minor details refer to the more restricted acceptance of the term as embracing comparative or human medicine. We cannot separate these products into distinct classes, one for animals and another for men, as both men and animals have benefited greatly from their preparation, and both are also interdependent for their very existence. The problems in dealing with diseased conditions in either case are based on the same general principles, and infectious disorders occurring in both are treated similarly.

Biological products, as we now interpret the term, are preparations designed for the diagnosis, prevention, and treatment of diseased conditions in men and animals caused by specific infectious

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agents or poisons. They include normal sera, antitoxic sera, antibacterial sera, toxins, attenuated vira, and bacterial vaccines.

To enumerate all of the products which are to-day available would require much more time than is at our command, and it is further questionable whether such a course would be of interest to members of this section, all of whom are more or less familiar with the more important of those in common use. We are, however, directly concerned with their evolution, and the desired laboratory requirements for their manufacture and subsequent testing are details of vital importance in the consideration of the broader aspects of their relationship to public health problems.

The development of any new field of science is largely dependent upon the individuality of the workers and the problems with which they are forced to contend. The developments in the preparation of biological products offer no exception to this general rule. Leaving out of consideration the introduction of small-pox vaccine by Jenner, their history is inseparable from the advances of bacteriological knowledge, and this knowledge is in turn associated with the improvements made in the grinding of microscopic lenses and the mechanical construction of compound microscopes.

Pollender in 1849, and Davaine in 1850, expressed the opinion that anthrax in animals was closely related to the presence of what they termed sticks and rods in the blood from cases of this disease. It was, therefore, but a step to the definite proof by Koch in 1875, when he described the morphology of the organism, that these bodies were the cause of the disease.

Pasteur, experimenting with chicken cholera in 1880, found that the causative organism could be cultivated in a specially prepared chicken broth. Returning to his laboratory after an absence of a few days, he observed that cultures made prior to his departure no longer produced the disease in susceptible fowl. Securing a fresh organism from another outbreak, he found that the fowls previously inoculated did not contract the disease, although susceptible fowl not so inoculated became affected and died in the usual period. He was thus able to demonstrate, largely by accident, that cultures of the bacteria responsible for the ravages caused by this disease could be attenuated and that such attenuated cultures were capable of establishing resistance or immunity in susceptible animals when used in suitable doses. Applying this knowledge to anthrax, he was able, in 1881, to prepare an attenuated virus which conferred immunity against this affection. Anthrax vaccine is now a commonly used biological product, although there is danger, and serious losses

have been reported following the use of an improperly prepared or impotent product. In connexion with these attenuated vira, it is of interest to note that investigators have shown that the inoculation with an organism usually harmless, may be capable of conferring a passive immunity against a disease. For example, the bacillus pyocyaneus confers immunity in sheep against anthrax for a limited period.

From this groundwork on immunity and the constant increase in our bacteriological knowledge, we have witnessed the introduction and extensive use of bacterial filtrates. Some of these, such as tuberculin, introduced by Koch, and mallein, introduced by Von Preusse and Kalning, are well known diagnostic agents and are often improperly called toxins. With the preparation of the bacterial filtrates just mentioned, which we now know to be thermostable, further experiments indicated the development of true toxins, such as diphtheria and tetanus, which are not thermo-stable. The unheated sterile filtrates from these latter organisms were found to be fatal in extremely minute quantities when injected beneath the skin of suitable experimental animals. With the knowledge that recovery from an attack of diphtheria conferred an immunity against a subsequent attack, it was considered that the introduction of the toxin into the body of an animal in non-fatal doses would cause the formation of a neutralizing substance or anti-toxin, and that this in turn would be capable of destroying the poisonous effect of the toxin. This theory was sound and Von Behring prepared an anti-toxin serum from dogs and sheep. Aronsoid used goats, and later Roux employed horses. While the use of the smaller animals established the general principle of the formation of an anti-toxic substance in the blood of a treated animal, the expense involved in the preparation of this serum would almost prohibit its general application if necessity required the use of the smaller animals. We may, therefore, consider that while Von Behring was the originator of the method, we must credit Roux, a pupil of Pasteur, with the practical solution of the means by which an adequate amount of serum could be secured to meet the demands for controlling diphtheria in the human.

Anti-bacterial and anti-toxic sera are prepared by inducing a high degree of immunity in the larger animals against the disease for which the anti-bacterial or anti-toxic sera are desired. The horse, being a very tractable animal, has proven the most satisfactory and is the one most frequently used. The horse was selected as a large amount of serum is available once the immunizing process

has reached a satisfactory point. Great care, however, must be exercised in the selection and subsequent care of the animals required for the experiment. Even with the most painstaking care one is not sure of securing a subject, the serum from which after the requisite treatment will show a satisfactory degree of potency. In some instances as many as an average of six horses are required to obtain one giving a satisfactory serum. When horses are immunized in the preparation of anti-plague serum, even a greater number may be required.

The anti-bacterial and anti-toxic sera are now well and favourably known, having demonstrated their efficiency in preventing and controlling losses from the diseases for which they are prepared.

With the preparation of these sera, as with the preparation of any new medicinal agent, it was but natural that some means of standardization should be sought. The studies of Ehrlich and the elaboration of his side-chain theory explained the chemical reactions involved in the process, and he was first to take the necessary steps towards the standardization of anti-diphtheritic serum. Rosenau and Anderson, in endeavouring to establish a unit on which they could always depend, have given us an elaborate process for accomplishing this end. They found that in the dry state serum would retain a certain strength for an almost indefinite period if kept in a vacuum and at a constant temperature. It is their standard unit which is now used for the guidance of manufacturers in the United States, and a suitable amount is supplied for the use of each at certain stated periods. Their method of testing requires accurately graduated glassware, a standard toxin which must be made by growing a suitable strain of the diphtheria organism on a special liquid medium, and an adequate supply of guinea-pigs of 250 grammes in weight.

I may here mention that the details which must be observed when manufacturing any of the biological products requiring the use of large cultures are very exacting. We must not only have a pure culture of the organism and a suitable medium, but we must have a strain capable of rapid growth on the surface of a liquid medium. All strains do not possess this feature. For some purposes solid media may be used, but for routine work we must accustom any given organism with which we may be working to the artificial conditions necessary for our particular requirements. The strongest diphtheria toxin producer is not necessarily the most virulent culture, nor are we able to produce a satisfactory mallein or tuberculin from the most virulent strains of their corresponding

organisms. Detailed experiments must be carried out with a large number of strains before we can hope to secure one suitable for the production of the large amounts of chemical bye-products required in a limited amount of time.

Many curious phenomena are observed in growing large cultures for any of these purposes. One of the most annoying is the ease with which large cultures of certain bacteria become contaminated, while very crude bacteriological technic will suffice in preventing contamination where other organisms are used. In the preparation of tuberculin, contaminations are rare, while the opposite is true when dealing with the bacillus mallei in the preparation of mallein. Large cultures of diphtheria are also contaminated with organisms which seldom or never appear in other special or routine work where the same incubating chamber is used. These occurrences are difficult to explain. I have considered that the aroma coming from a large culture has an important bearing on this feature. All bacteriologists are familiar with the odour coming from cultures commonly seen in any laboratory, and we similarly have distinct characteristic odours given off from cultures of bacillus mallei, bacillus diphtheriæ, bacillus tuberculosis, and others. So important are these odours that a laboratory worker with a delicate olfactory organ can distinguish a pure from an impure culture. Under such conditions, where we have no diagnostic method of staining, I consider the microscopic examination a confirmatory procedure and not a primary factor. I am, further, of the opinion that the aroma has a direct relationship to the efficacy of any of these bacterial products.

Normal sera, or the sera from a normal or untreated animal, may be used with more or less benefit in diseased conditions which are but slightly or wholly non-infective to the animal from which they are taken, such as normal horse serum for tuberculosis. Normal bovine serum has been used with a certain degree of success in a few cases of human glanders and is worthy of further trial. Normal sera from other animals, such as goats, hogs, dogs, will doubtless be used just as soon as a pioneer therapist who has the courage to determine their value in suitable cases and an individual versed in the technic of preparing the serum join forces. While the occasions for the use of normal sera are naturally somewhat limited, they are deserving of more attention than they have heretofore received.

Killed cultures of bacteria, now known as bacterial vaccines, have occupied a very important place among biological products for many years. None of these have received greater attention than

that known as Haffkine's prophylactic consisting of the killed cultures of bubonic plague. The bacterial vaccine receiving the most attention at the present time is the anti-typhoid vaccine, the efficacy of which as a prophylactic is well established from the numerous statistics available.

With the further development of bacterial vaccines we have, from a bacteriological standpoint, an extensive field opened before us. These products require great skill in their preparation if they are autogenous in character and properly standardized. In a large measure their success depends, as with other products, upon the individual skill of the producer. All who are trained in the art and science of medicine do not make good clinicians, nor do they become equally proficient in the various specialties. Likewise, all pathologists do not acquire an equal proficiency in the preparation of these vaccines. The results are largely dependent on individual idiosyncracies and judgement. The combined or polyvalent vaccines appear to be the most promising, and will undoubtedly be the ones receiving the most general use. They have the advantage of being prepared from several strains of the same organism and are intended for use in those conditions where the infecting agent is similar to the types from which they are manufactured.

With respect to the necessary facilities required for the preparation of biological products, I will add but a few words. The buildings need not be expensive nor elaborately equipped. They should be spacious and well lighted, well ventilated, and provide plenty of room for the laboratory workers and the animals required in the conduct of the work. The details must be considered individually in such instances, according to the work which is to be undertaken. All laboratory workers have a certain pride in their surroundings, and it is to be expected, considering the risks constantly taken while working with large cultures of the most virulent infectious agents in the preparation of biological products, that we should desire to safeguard our own existence in every possible manner. In no line of endeavour is the accidental hazard so great. This feature should be considered of paramount importance in the construction and equipment of buildings for the purpose.

You are aware that a biological product prepared by a certain manufacturer always gives uniform results and is seldom or never followed by after effects of a serious or annoying nature. When this particular product is for any reason unavailable and a substitute is used in its stead, less favourable results follow and serious after effects may occur. The repeated occurrence of similar dif-

ficulties may be anticipated, until it becomes the business of some properly constituted authority to examine all such products manufactured or offered for sale in Canada. The manufacture of the products now used in Canada provides a source of revenue to individuals and companies, and, therefore, the potency is, to a very large degree, dependent upon the integrity of these individuals or companies. On the whole the integrity displayed has been of a very commendable order, although we are aware that the trade relations of this country were seriously jeopardized a few years ago by an outbreak of foot-and-mouth disease in the United States which was finally attributed to the use of a contaminated virus in the preparation of small-pox vaccine.

At the present time, the biological products available for use in Canada, with a very few exceptions, are imported, and there are at present no restrictions exercised over the facilities provided for use in connexion with their manufacture, nor is any standard established to which they must conform before being offered for sale. As a laboratory worker with an intimate knowledge and an extended experience in the manufacture of certain biological preparations, I am convinced that there should be some restrictions placed, not only on their sale, but on the safety of the surroundings and the conditions maintained during their manufacture.

R. BEVERLEY WILSON, of Leamington, who is charged with having practised medicine without a license, was acquitted by Judge McHugh. It was held that the practice of osteopathy was not a breach of the Medical Act. A case against his mother was also dismissed on the ground that although she had practised upon a patient, she did not receive any remuneration. The charge was first heard by Police Magistrate Selkirk, who dismissed the case, and his view was confirmed on appeal.

SOME OBSERVATIONS ON CHRONIC
MYOCARDITIS

BY JAMES THIRD, M.D.

TO the busy general practitioner, the integrity of the valves of the heart is all important. As a rule he is quite indifferent as to the condition of the myocardium. A glance at the mortuary tables of any large life assurance company will show the truth of this statement. In the annual report of the receiver-general for the province of Ontario, myocarditis is not even mentioned as a class. And yet, the fact remains that chronic affections of the valves, *per se*, if certain ulcerative conditions be excluded, seldom if ever cause death, so long as the myocardium is in fairly good condition. When the myocardium becomes seriously involved in an associated or distinct pathological process, then, and not till then, does the patient enter on the field of actual danger. That danger is proportionate not to the extent of the valve involvement, but to the extent of myocardial weakening. A knowledge of the extent of this weakening is essential both for prognosis and treatment.

Let us consider the clinical aspects of one type of case. This type may be termed the business man's heart. It is largely the result of the high pressure demanded by the conditions of modern business life. It is not necessarily the result of a struggle for existence. More often, in this country at least, it is the result of a struggle for supremacy and the social position and power which supremacy gives. The man is usually in the early afternoon of life. Day in and day out, he sits before his desk. He indulges to the limit in the luxuries of the table. He takes few holidays. He smokes heavily and may take wine in, what he terms, moderation. Even if a teetotaler, he does not escape. It is a common observation that many teetotalers are excessive eaters. Over-eating probably kills more people than over-drinking at the present time. This is no argument in favour of drink, however. He finds himself increasing in weight and in abdominal girth. As a result of his sedentary habits and excessive indulgence at the table, certain toxins are developed in his sluggish intestinal tract. These, while in the blood, exert an injurious influence upon the nutrition of the

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heart and arteries, and in their final elimination tend towards the development of a chronic, interstitial nephritis.

Before long, symptoms of undoubted myocarditis make their appearance. These are a gradually developing cardiac weakness, with dyspnoea, at first on the stairs or a grade, later when at rest, and finally, even in the sitting posture. Palpitation is a frequent symptom and this the patient usually attributes to stomach disturbance, an inference that may be more or less correct. Some pain in the precordial region, especially after exertion, is a fairly early symptom. This is due to a stretching of the cardiac muscle. The area of cardiac dullness is increased. The apex as a rule is displaced down and out. A mild bronchitis with some oedema in the posterior bases of the lungs may be present. A somewhat later, but important, symptom is pain in the right hypochondrium. This may be due partly to stretching of the capsule of the liver, as that organ gradually enlarges, and partly to hyperalgesia and rigidity of the overlying muscles, conditions always present except in the most advanced cases. There is usually some dizziness. A small percentage of cases have momentary periods of unconsciousness. These have been regarded as examples of minor epilepsy of vascular origin.

The psychologic influence of the patient's knowledge of the presence of cardiac incompetence is often very marked. General irritability of temper, difficulty of mental concentration, introspection, amounting in some cases to actual despondency, are common. There may be slight oedema of the feet and legs towards the close of the day. As a rule there is well marked dilatation of the venules of the cheeks, especially over an area about 1.25 in. in diameter, slightly internal to the malar prominence. There is also general engorgement of the larger veins of the body, the pulse is irregular, and the radials may show evidence of sclerosis.

While the amount of urine voided during the day is diminished, frequent and increased micturition at night is the rule. The urine may be normal, but of low specific gravity, or it may show the change of an incipient, chronic, interstitial nephritis. In the later stages, the urine is greatly diminished and loaded with albumin. The blood pressure may or may not be elevated.

Tracings from the radial artery and jugular vein usually show, in fairly advanced cases, persistent arrhythmia with more or less paralysis of the auricles. The paralysis of the auricles is the result of the high venous pressure, and is evidenced by the absence of the auricular wave in the jugular tracing. At the same time, in

this class of case, there is complete absence of signs of organic, valvular disease. There may be a soft systolic murmur at the apex, due to muscular insufficiency, but it is rarely transmitted to the axilla and often passes off during rest or treatment.

There is absence of diastolic murmurs in cases of functional pulmonary or aortic insufficiencies. Personally, I am unwilling to make a diagnosis of chronic myocarditis unless there is convincing evidence of arterio-sclerosis, and unless all other causes of cardiac incompetence can be satisfactorily excluded.

In arriving at a diagnosis, age is an important factor. If symptoms of heart disease develop slowly in a person who has passed mid-day in life, it is fair assumption, until proved otherwise, that degeneration of the heart muscle is responsible for the symptoms, or as Babcock puts it, "Hypertrophy of the heart in an individual of middle age may be regarded as synonymous with degeneration."

Nocturnal dyspnoea, attacks of angina pectoris, the discovery of albumin and casts in the urine, point strongly to a well-marked, chronic myocarditis. A blood pressure constantly above 150 mm. suggests degenerative change in the cardio-vascular-renal system. A weak first sound at the apex, extra-cardial causes being excluded, indicates a weakening of the left ventricular wall. In addition to the arrhythmia, the sphygmogram may show the plateau top. This may mean increased resistance in the peripheral circulation or a lowered pumping power on the part of the left ventricle.

The pulsus alternans is occasionally observed. It always implies a yielding of the heart muscle to the strain put upon it—a failure of the function of contractility. A comparison of the pulse in the recumbent and erect positions should never be omitted. A variation in rate of fifteen or more, nervous disturbances being excluded, suggests myocardial weakening. In addition, the patient should be required to walk briskly about the room or ascend a flight of stairs. If these movements develop a blowing murmur at the mitral area, it is fair to assume that there is some degree of myocardial insufficiency.

These, then, are some of the more important symptoms of one form of chronic myocarditis—a form, in its earlier stages at least, that may be greatly influenced by judicious advice and medication. I have never observed heart-block in this type of case.

A CASE OF CHRONIC FIBROID MYOCARDITIS WITH HEART-BLOCK

A. L., aged seventy-eight, labourer, admitted to Kingston

General Hospital, February 3rd, 1911, complaining of weakness and some shortness of breath on exertion. Patient gave a history of rheumatism; had to void urine from one to three times during the night for several years; had used tea and tobacco and probably alcohol to excess; had noticed some cedema of the feet in the evening for several months.

PHYSICAL EXAMINATION: Patient is fairly nourished, face pale and rather haggard, venules dilated; weight, 164; pupils react to light and accommodation; no marked respiratory distress; no tracheal tug; no enlargement of lymph glands; thorax, barrel-shaped; vocal fremitus not increased; has some cough and a few moist rales are heard low down at the back; urine, normal.

HEART: Feeble impulse in the sixth intercostal space, well outside the nipple line; heart sounds everywhere feeble; a soft systolic murmur is heard at the apex, which is transmitted to the angle of the scapula and not changed perceptibly by movement; radials, very sclerotic; slight cedema of feet; no cyanosis; a simultaneous tracing of jugular and radial shows a rhythm of 4 : 1, the jugular 120, the radial 30.

Just before death, the radial dropped to 12. The radial tracing shows, in addition, in the descending line, a number of minute elevations. According to MacKenzie, these are due to the impact of the left auricle during systole, against either the aortic valves or the root of the aorta. On the morning of March 1st, he complained of considerable precordial distress and was slightly delirious. He was given morphia, gr. $\frac{1}{4}$, which relieved the symptoms and, temporarily at least, improved his condition. His blood pressure was 115, but as his palpable arteries were quite atheromatous, this reading was of little or no clinical value. On March 4th, the nurse reported Cheyne-Stokes respiration during the night. The house physician gave strychnia, gr. $\frac{1}{60}$, hypodermically, for the purpose of stimulating the respiratory centre, but without effect. On March 5th, the pulse was difficult to count. There appeared to be from twenty-eight to thirty beats to the minute, of fair volume, and about three times that number of very small, indistinct beats. The same facts were elicited on auscultation over the mitral area. A jugular-radial tracing showed these semi-beats to be auricular in origin. He was given atropine, gr. $\frac{1}{60}$, hypodermically, thus partially paralyzing the vagi without any effect on the pulse or jugular rate.

It was inferred from the evidence that there was a lesion of the bundle of His, or, in other words, that the heart-block was



I. Simultaneous tracings of the radial and jugular pulses. Upper, radial; lower, jugular. The x's indicate the points at which the radial and jugular beats correspond.



II. Upper, radial; lower, jugular. Radial pulse 12 to minute. Jugular shows fibrillation—taken a few hours before death.

To illustrate Dr. Third's article: "Some Observations on Chronic Myocarditis."

myogenic in origin. A few hours later, the patient being very restless, morphia, gr. $\frac{1}{8}$, was administered hypodermically. Cheyne-Stokes respiration was now very marked. Before the morphia took effect, the pause occupied 38 seconds, the respiration 50 seconds. One hour later, the pause occupied 44 seconds, the respiration 32. As was to be expected, the morphia intensified the Cheyne-Stokes type of respiration. Except for short intervals while he was awake, the Cheyne-Stokes breathing continued until his death, March 12th. The tracings were made during the pause. Diagnosis, chronic myocarditis with myogenic heart-block.

I am indebted to my *confrere*, Dr. W. T. Connell, for the following pathologidal report:

SUMMARY OF AUTOPSY BY DR. W. T. CONNELL

SUMMARY OF AUTOPSY:—L—, aged seventy-eight; dead fifteen hours; cedema of right leg. One quart serous fluid in right pleural sac. Heart generally enlarged, weight 13 ozs., all chambers moderately dilated and left ventricular wall hypertrophied; heart muscle showed evident fibrous tissue increase more marked towards apex; the aortic cusp of the mitral was thickened and fibrous but not retracted, the thickening spreading into mitral ring and neighbouring septum; moderate patchy, fatty, and calcareous atheroma of aorta throughout course; nodular thickening of first portions both coronaries with some narrowing of lumina. Red, granular kidneys.

In view of clinical history, a block of tissue was removed from septum so as to include the bundle of His. This block was subdivided, numbered, and sectioned so as to follow this bundle. In no place was the bundle completely blocked, though there was throughout its course much increase of fibrous tissue and isolation of the muscle bundles, while just as bundle passes into ventricular septum the fibrous increase was marked and accompanied by calcareous deposit, the auriculo-ventricular bundle being here nearly blocked. Sections of heart muscle elsewhere also show moderate increase of fibrous tissue, this being most evident at apices of ventricles and in left ventricular wall below anterior segments of aortic valves.

Case Reports

MELÆNA

THE literature on hæmorrhages of the new-born is not very plentiful. For this reason I have thought it worth while to bring before you a brief outline of a case which I had under my care in May, 1911, with a few notes on other cases. Previous to this I had seen two cases of gastro-intestinal hæmorrhages in infants, both during my term in the Montreal Maternity Hospital, 1907-1908. Taking first the two cases which occurred in the Montreal Maternity Hospital in 1907-1908:

CASE 1. This was a case of the mother suffering from symptoms of eclampsia, general anasarca, headaches, etc., but with no convulsions. Labour came on spontaneously at term. The forceps were used early in the second stage and the early delivery of the first child followed. The second child, the one which developed the hæmorrhages, was delivered by internal version and extraction by the Swellie-Veir method, with some difficulty in the delivery of an after-coming head. Within twenty-four hours of birth, hæmorrhages began by the mouth, which were quickly followed by severe ones in the bowel of bright red blood. The child was kept warm and given calcium lactate by mouth, but died before twenty-four hours had elapsed. No history of hæmophilia or specific disease could be obtained from the parents.

CASE 2. In this case, also, no history could be obtained of hæmophilia or specific disease. Hæmorrhages began in the same way on the second day of life, and the child rapidly became waxlike and weak, and finally died within twenty-four hours from the onset. The treatment given was quiet, warmth, and calcium lactate internally.

Post mortems were performed at the Royal Victoria Hospital, and, though I am sorry to say that I have not a copy of the report, I was present and remember in each case that there were minute ulcers throughout the mucous membrane of the stomach and the duodenum with a few scattered ones in the lower bowel. Hæmorrhagic spots were found also over the surface of the pericardium and over parts of the liver.

Read before the British Columbia Medical Association, Vancouver, September 5th, 1911.

CASE 3. This was a male child, the second in the family, weight $9\frac{1}{4}$ lbs. It was born May 5th, 1911, and delivery was made with low forceps. There was no difficulty in birth, and no vigorous means of resuscitation were necessary. The mother and father were young adults in good health, and there was no history of hæmophilia. The child was healthy till 9.45 a.m., May 8th, the fourth day of life, when he vomited a large quantity of dark brown fluid, which on careful inspection proved to be blood. The condition of the baby at this time was quite alarming. He lay in his cot breathing quite quietly, with eyes closed and the whole expression one of comfort. The colour of the face was good, as was also that of the mucous membranes.

An examination of the nose and throat did not explain the vomiting nor did the mother's nipples prove to be fissured. Suspecting further hæmorrhages, I ordered the baby to be kept absolutely quiet and warm, the diapers to be left loose under the buttocks so that they could be changed without much disturbance to the child. The motions up to the present being simply meconium, the baby was placed on an artificial feeding of a weak modification of cow's milk, as breast milk was scant and not yet changed from colostrum. At 11 a.m. the same day, the fourth day of life and first of onset of the disease, the child again vomited bright red blood containing clot. At 4 p.m. the same day, there was a bowel movement containing meconium only. At 7 p.m. the bowel movement contained a quantity of blood. At 9 p.m. there was a hæmorrhage from the bowel with both fluid and clot. At 10.30 p.m. a like hæmorrhage followed.

On the fifth day of life and second of illness, at 1 a.m. there was a large hæmorrhage from the bowel and the baby now became very pale, and waxlike, and weak. At 11.30 a.m. there was another large hæmorrhage from the bowel. Up till this the baby was getting gelatin solution, 10 per cent., one teaspoonful every two hours by mouth, and calcium lactate, grs. v., every two or three hours, by mouth. As the baby was in such poor condition and as immediate results were necessary, I gave a subcutaneous saline of about four or five ounces into the thighs, and then decided to inject serum. With this in view I performed venesection on the father and collected the blood direct from a vein of the arm into sterilized test-tubes and then kept these on ice, the ends being plugged with sterile absorbents till the serum separated. At 5.30 p.m. the same day, the second day of illness, the baby had another hæmorrhage (bright red) from the bowel. At 5.45 p.m. there was another smaller hæmorrhage from the bowel. At 8 p.m., 10 c.c. of

serum was injected subcutaneously into the abdominal wall. At 10 p.m. there was a slight hæmorrhage from the bowel.

On the third day of illness, at 12.15 a.m., there was a slight hæmorrhage from the bowel with flatus; at 2 a.m., a large hæmorrhage from the bowel with flatus; at 4.20 a.m., a slight hæmorrhage from the bowel with flatus. At 5.30 a.m. a large amount of blood was passed with flatus. The blood was very dark in colour. At 6.30 a.m. the child expelled a great deal of flatus with some blood; at 12.30 noon, flatus without blood, and at 8.30 p.m., flatus and a trace of blood. On the fourth day of illness at 10 p.m. there was a bowel movement containing a slight amount of blood, and on the fifth day of illness, at 1.45 a.m., a very loose movement streaked with blood.

A count of the hæmorrhages shows that before the injection of the serum there had been nine. After its injection six followed, of these two only being of much consequence. Adrenalin was used for a few doses only just before the administration of the serum, and for two doses after. The condition of the baby became alarming previous to the injection of the saline. It dropped from $9\frac{1}{4}$ lbs. at birth to $7\frac{1}{4}$ lbs. when next weighed ten days after the onset and five days after the cessation of the hæmorrhages. From the day that the hæmorrhages ceased, an improvement could be seen daily, the baby regaining its birth weight one month from the date of the last hæmorrhage. The colour came back very slowly to the skin, but a distinct improvement was early noticed in the lips and finger nails.

In this case so many therapeutic measures were adopted that it is really hard to say which did the work, but to my mind there was such a distinct improvement following the one injection of serum that although prepared to give another injection the following day, on seeing the baby I did not deem it necessary.

On looking up the literature on the question of hæmorrhages of the new-born, I find the best article is one written by J. Edgar Welch, pathologist of the Lying-In Hospital, New York. In his series, the ætiology of the hæmorrhages was unknown, except that none were due to trauma. Some, he says, were very likely hæmophilia, and others due to infection—staphylococcus, streptococcus. Bleeding occurred during the first week, and usually on the second, third, or fourth day. Bleeding came from the skin, mucous membranes, or serous cavities, hæmaturia, etc. He states that amongst the list of drugs mentioned the favourite are calcium salts, solutions of gelatin, and adrenalin.

In 18 cases reported in the Lying-In Hospital, New York, in which these remedies were used, 17 deaths occurred, demonstrating

the high mortality in this disease and the futility of all previous therapeutic measures. With this in mind and the possibility of producing serum sickness by using serum of different species, he decided to try normal, human serum. In this he found an agent that successfully controls hæmorrhages in the new-born. Fresh human serum has been demonstrated to be bactericidal, never to give serum sickness, or cause anaphylaxis in the human subject. On the other hand, it is a perfect form of food, is predigested, and is ready to be taken up and utilized by the tissues and cells of the body. As a proof of its harmlessness he quotes the case of injecting into a normal adult 150 c.c. of serum taken from an eclamptic after her twentieth convulsion, the eclamptic patient dying immediately after. There was no noticeable effect subjectively or objectively. The dose depends upon the urgency of the case. It is advisable to begin with doses of 10 c.c. and repeat three times daily, in the case of moderate bleedings. In severe cases, q. 2 h. and larger doses should be used. He quoted having given in one case 209 c.c. in five days as follows:

- 64 c.c. in 6 doses the first day.
- 65 c.c. in 6 doses the second day.
- 30 c.c. in 3 doses the third day.
- 22 c.c. in 2 doses the fourth day.
- 28 c.c. in 3 doses the fifth day.

PATHOLOGY OF MALÆNA. It occurs 1 in 1000. According to Silbermann, death occurs in 56 per cent. Dr. Herman Schoppler reports the following post mortem in two cases of gastro-intestinal hæmorrhages in infants. The stomach contained dark blood and some linear blood extravasations, but no ulceration or excoriation. There was no loss of substance in the intestines, although they contained thin blood. The liver was large, anæmic, and greyish-yellow in colour. The portal vessels showed no peculiar colour. A microscopic examination in the stomach failed to show any defect in the epithelium or any signs of inflammation. In the mucous membrane of intestines, however, there was an abundant round-cell infiltration. The subcutaneous tissue was the site of the hæmorrhage and the blood vessels were distended with clotted blood. There was no abnormal appearances in the liver. In the second case the macroscopic appearance was the same as in the first case. A microscopic examination of the stomach showed no abnormal appearances, but in the intestines the epithelium was found wanting in small areas, and abundant collections of small round cells were everywhere visible, giving the mucous membrane the appearance of inflammatory infiltration.

Vancouver

C. F. COVERNTON

Editorial

AN AUSTRALIAN CONTRIBUTOR

THE work of the world always goes better for the presence and voice of the enthusiast, whether it be in religion, in science, or in art. At times we are inclined to abuse the man who voices sentiments that are distant from our own, whether those sentiments be in advance of ours, or apparently so far to one side that we do not recognize that he is going in the same direction as we are; the enthusiast has usually had to bear many hard knocks, and the majority of them have probably been undeserved. In **"Studies in Pulmonary Tuberculosis"* by Frederick Guy Griffiths, B.A., M.D., Ch.M., we welcome the voice of the enthusiast, and doubly so that it marks the fact that our sister, Australia, is active in work that appeals greatly to us. Dr. Griffiths is an intense believer in the efficacy of tuberculin, both as a means for diagnosis and a means of cure; and, although some of his readers may not hold his robust faith in its efficacy, it is stimulating to have the case put forward strenuously and dogmatically. If the selection of these terms seems to imply—and such is not the intention—that we think the author goes too far in his claims, we hasten to say that his active optimism is worth far more than the paralyzing scepticism of so many of the profession upon this very point. If the truth lies somewhere between the two, we feel sure that it is far nearer to the position held by Dr. Griffiths than to the ground occupied by the man who folds his hands and says "We cannot tell!"

**STUDIES IN PULMONARY TUBERCULOSIS: ITS DISSEMINATION, SPECIFIC DIAGNOSIS AND TREATMENT AND SOME POINTS IN ITS PATHOLOGY*, BY FREDERICK GUY GRIFFITHS, B.A., M.D., Ch.M., Honorary Pathologist and Honorary Assistant Physician, Royal North Shore Hospital of Sydney, etc. Illustrated with charts and diagrams. London: Baillière, Tindall & Cox, 8 Henrietta Street, Covent Garden, 1911.

To be precise, we believe that Dr. Griffiths has not laid enough stress upon the possible falsity of a tuberculin reaction and upon the *possible* deleterious effects of tuberculin, and that he lays too much stress upon the direct effect of tuberculin upon processes such as fibrosis, and too little weight upon natural body defences, perhaps we should say upon individual differences of resistance. In Canada, we think that room contamination is a great danger, apart from actual contact, and that registration of cases is absolutely essential for this, if for no other reason. We are faced by a danger, also, that infection in our cattle, widely infected as they are, may be overlooked if too little weight be given to the possibilities of infection from bovine sources.

We admire the precise, accurate descriptions of various methods that have been lately introduced, and the full descriptions and accurate knowledge, possessed by the writer, of the actual state of all the patients whose cases are described; there can be no praise more fitting to bestow upon the writer of this book than to say that if time should prove any of Dr. Griffiths' views to be incorrect, his zeal and his accuracy indicate that he will be the first one to discover it.

DR. R. A. H. MACKEEN

ROBERT ARTHUR HALIBURTON MACKEEN was the youngest son of the late Hon. William Mackeen, of Mabou, who was for many years a member of the executive council of Nova Scotia in the days before confederation. He was the youngest brother of the Hon. David Mackeen of the Canadian senate.

He studied medicine at the Bellevue Hospital Medical College and graduated there in 1880. For nearly thirty years he practised in Glace Bay, and was the leading practitioner in that district. Early in his career he developed a special aptitude for surgery, and from the very nature of his practice he

had many opportunities for the exercise of his skill in the treatment of injuries. He was a diligent student of surgery, and made every effort to perfect his knowledge by frequent visits to the chief centres of surgical activity in Canada and the United States, and twelve years ago spent some months in the study of surgery in Edinburgh, and London, and in Germany. At a time when no hospital existed in his neighbourhood, the treatment of his surgical cases reflected the highest credit upon him, but with the establishment of St. Joseph's Hospital in 1904 his surgical work rapidly increased and his reputation for success in all departments of surgery spread widely.

His career is a shining example of what may be done in surgery by a man busy with the cares of a general practice, and alas, also an illustration of the serious demands such work makes upon the worker. Despite his powerful frame the physical fatigue and mental strain were too much. Symptoms of arterio-sclerosis began to appear. The death of his wife, a woman of singular charm and talent, in 1909, was a crushing blow from which he never recovered. In June, 1910, he was very seriously ill, and spent some weeks in the Royal Victoria Hospital in Montreal under the care of his friend Dr. W. F. Hamilton. He recovered to a surprising extent and resumed practice. Early last year he spent some time in England and at Vittel, in France, with some relief to his symptoms. Again he bravely tried to carry on his work at St. Joseph's Hospital. But he broke down completely at the end of November, and from that time was unable to leave his bed. Cardiac and renal complications became more marked, and he suffered greatly from dyspnoea. He faced the inevitable end with unswerving courage and solemn hope. On the day preceding his death he was unusually cheerful and happy, and he passed away quietly, in his sleep, at four o'clock on the morning of January 14th. His family, consisting of five daughters and one son, were at his bedside.

The funeral, which took place on the seventeenth, was unusually impressive and a striking testimony to the regard and

affection in which he was held by the community. Many came from a distance, and there were about forty of his professional brethren in the procession. Clergymen of all denominations were present. The interment took place in Sydney.

Dr. Mackeen always took an interest in public affairs, and had been warden of his county for four years, but in recent years the pressing claims of his practice gave no time for aught else. There was something unusually attractive in his personality; he was a strong and lovable spirit. His sincerity, his devotion to duty, his kindly thoughtfulness, endeared him to his patients. He had a great fund of humour, and he had the happy gift of preserving an imperturbable gravity while moving his hearers to merriment.

The *Sydney Post*, in an editorial, says: "He had the satisfaction of being more than once urged by leaders of his profession to remove to larger centres where his work might have been carried on in easier circumstances and would have received larger emoluments. He remained to the end in his chosen surroundings, gaining the confidence of the community and enjoying a family life and friendship of peculiar tenderness and strength."

ONTARIO MEDICAL COUNCIL

THERE has been a lull in the discussion of the affairs of medicine for several months, owing to a disposition on the part of most men to see if the members of the Medical Council were sincere in their intention to reorganize themselves. Evidently there is a disappointment in store for the optimists, as apparently no meeting of the reorganization committee has taken place, and those who profess to know state that there is no real anxiety on the part of the Council to go on with this work. If so, there will be a rude awakening for somebody, as there is plainly no necessity for a body as large as the Medical Council; and if they do not obey what

was plainly the mandate of the profession, they will pay the penalty. Already it is stated that the large fee for registration of students and for their examinations is simply intended to provide the essentials for a cheap holiday for the many members. Surely the Council should be anxious to place itself beyond criticism just as soon as possible. It should recognize the fact that it escaped from a most unpleasant predicament last year by yielding to the pressure from all sides. Surely the members will not run the risk of creating another dangerous situation. Let the committee on reorganization do the work it was asked to perform, and let them do it fairly and without recognition of anything but the needs of the profession.

PHYSICIANS OF THE INSANE

IN the profession of medicine there is no labour so arduous as that which falls to the lot of superintendents of asylums for the insane, and to their assistants. The task is exacting, and the continual association with misery makes heavy demands upon the heart as well as upon the mind. This is a condition which no amount of good-will on the part of the public can prevent. They can, however, lighten the labours of these physicians, who serve them so well, by removing from their minds the fear of penury. The certainty of receiving a pension would be a great consolation during long years of service amongst the insane.

Dr. Burgess, the superintendent of the hospital for insane Protestants at Montreal, is rendering the best possible service to the insane themselves by his advocacy that the government should grant a pension to medical officers of long service. There is nothing new in such a proposal. Judges of sessions even in Quebec are entitled to this privilege, and we submit that the claims of physicians to the insane are even greater than theirs. In England and many other countries this practice prevails.

A deputation has waited upon Sir L. Gouin, the premier, who has always shown himself sympathetic towards any good cause. Many important facts were drawn to his attention. Owing to the increased number of patients it was explained that the duties of the physicians are daily becoming more onerous. In Quebec alone the number of insane to be taken care of has increased threefold during the last twenty-five years, and it is rapidly increasing. The salaries received by physicians are inadequate to enable them to make provision for the future of their families, and of themselves if they should be incapacitated. In private practice the earnings of a physician usually increase year by year, whilst in asylum work the remuneration, besides being small, is stationary. Their duties are arduous and tend to shorten life, and there is, in addition, the danger of violence from the patients. The late Drs. Duquette and Vallée may be used as an illustration of this fact. Indeed, Dr. Vallée narrowly escaped death at the hands of an insane patient, and never recovered from the effects of the injury.

The office is the most difficult to fill in the whole civil service, because, apart from administrative requirements, it demands special scientific training, difficult and expensive to acquire. The weighty responsibilities it involves and its protective value to society make it one of the most important of the appointments from the liberal professions in the service of the government.

SUAVITER IN MODO

THE Quebec provincial board of health never errs on the side of severity. For several months it has been known that small-pox was prevalent in the villages and country, and that many municipalities were doing nothing to check the disease. In those places small-pox is regarded as a trifling, or inevitable, condition against which remedial or preventive

measures are either unnecessary or unavailing, according to the view which is adopted. Indeed, to be *bien picotte* is considered in some circles of society as an enhancement of manly beauty.

The inspectors have returned from a visit to the infected districts, and the reports which they bring in are alarming. Whilst it is quite true that the type of disease is mild, it is also true that mild cases often give rise to furious epidemics. That occurred in Montreal in 1885, and so far as we are aware, there is no reason, in the absence of precautions, why it should not occur again. These local centres of infection are a menace to the country as a whole.

The inspectors report that in St. Germain de Grantham there were twenty-two houses in which patients were suffering from small-pox. In St. Elphege d'Yamaska the mistress of the school was attending to her duties although she bore recent traces of the disease. In Batiscan the public disregard of precautions went to such lengths that persons suffering from small-pox in a mild form were going about the streets, calling at the post-office, visiting the general stores, and engaging in the ordinary affairs of the community. In the Lake St. John district the conditions are even worse, and inspectors have been dispatched to the scene.

In a communication to the press, Dr. Elzear Pelletier, the secretary of the board, informs us that it has been the practice to refrain from publishing the names of such municipalities as voluntarily come forward with reports of small-pox conditions. He intimates that, in the case of the various centres which have been discovered as having openly defied the public laws and the recommendations of the provincial officers, their names will be given publicity, "so that they may be afforded whatever disadvantages may accrue to them by the publication of conditions prevailing within their borders." Moreover, he adds, it is not unlikely that more serious steps will be taken to impress upon the authorities of such places the gravity of their actions in neglecting to follow out the law.

Dr. Pelletier has in reality, by continual effort, created in the province of Quebec whatever sentiment exists in favour of public health, and he has done it in the face of many difficulties, by persuasion and gentleness. This sentiment is now sufficiently strong to allow him the opportunity of adding example to precept; and he has the power, under recent legislation, to make an example of any municipality which allows itself to become a menace to the community. He has always been *suaviter in modo*: he might now well be *fortiter in re*.

MEDICINE IN ALBERTA

ALBERTA is again proving itself to be a most valuable laboratory for experiments in legislation, and with the courage of youth it does not count the cost of the service which it is rendering. The most recent experiment which it has undertaken is in the field of medicine. On December 20th, assent was obtained to an amendment of the "Medical Profession Act," giving sanction to principles and practices which have been successfully resisted in all other parts of the world.

The medical council is enjoined to admit upon the register the name of any person who can produce a certificate from the registrar of the University of Alberta that he is qualified to practise osteopathy or homœopathy, and the examination of candidates is to be undertaken by the university. It is expressly provided, also, that the approval of the college of physicians and surgeons shall not apply to the subjects in which osteopaths and homœopaths shall be examined.

Section nine is perhaps the most interesting part of the experiment. It provides that any person who has practised osteopathy in Alberta for at least four months previous to the passing of the Act shall be granted a certificate without examination. The reservation, however, is made that such person must have the approval of the American Osteopathic Association.

Apparently in Alberta the practice of medicine is divided into compartments, as the Act specifies that, "if any person registered in respect to one class of practice shall practise in respect to another class he shall upon conviction be fined." We are not sufficiently conversant with the practice of osteopathy to decide what bearing this section will have upon that art; but it would appear that a masseuse who recommended to a patient the use of a glass of mineral water would be transgressing the rules. Similarly, if a homœopath administered a hypodermic injection of morphin he would be practising out of his class; or a physician who attempted to encourage "the flow of the vital juice" might be held to be practising osteopathy. If a case comes into court we shall likely gain some information as to what osteopathy and homœopathy really are.

The regulations of the practice of midwifery are not clear. Apparently midwives may register, but unregistered midwives may exercise their calling in country districts, or in a village or town where there is no resident, registered practitioner. It would seem that an osteopath is considered to be "a practitioner," in which case the privilege of practising midwifery might as well be extended to a piano-tuner as to him.

When next the legislators of Alberta are in the mood for making experiments which have been attempted nowhere else in the civilized world, we would suggest that they abrogate all restrictions upon the practice of medicine, leaving patients to make their own choice, and practitioners to the common law to answer for their conduct. One fact stands out clearly above all legislation, and that is, that a physician of ability and character has nothing to fear, or hope, from the presence or absence of restrictions.

IN this number appears a list of members of the Canadian Medical Association. It is extremely difficult to secure absolute accuracy in a list of this nature. Members observing any

errors in names or addresses are requested to communicate with the editor, and if the errors are at all numerous a revised list will be published in the next issue.

BULLETIN No. 228 from the laboratory of the inland revenue department contains a study of maple sugar by Dr. A. McGill, the chief analyst. It deals with the examination of 456 samples. Standards for the judging of maple sugar and maple syrup in Canada were established under section 26 of the "Adulteration Act" on March 22nd last. It was believed that the standards were of such a nature that it would be impossible for a sample of sugar made entirely from maple sap to be adjudged other than genuine. It was believed that even if samples more or less sophisticated might escape detection, it would be impossible to consider genuine sugar as adulterated. Complaint was at once made that sugar might be genuine and yet not comply with the standard. Accordingly, the analyst obtained 456 samples which were undoubtedly genuine, and found upon examination that this complaint was substantiated, as 31 samples of undoubted genuineness failed to reach the legal requirements. Under these conditions it is apparent, as Dr. McGill affirms, that the standard must be rewritten, since there should be no possibility of branding a genuine food product as adulterated.

MESSRS. LONGMANS, GREEN & COMPANY announce the publication of International Medical Monographs of which Dr. Leonard Hill and Dr. William Bullock are the editors. Monographs will be published at short intervals dealing with subjects of exceptional interest and importance, and each part may be obtained separately. Monographs have already been issued upon "The Mechanical Factors of Digestion," "Caisson Disease," "Blood Vessel Surgery," and "Syphilis." Other works will appear shortly upon "Lead Poisoning," "The

Protein Element in Nutrition," "Shock," and "The Carrier Problem in Infectious Diseases."

APPLICATIONS are invited by the medical faculty of McGill University for the Douglas Medical Research Fellowship, of the value of \$1,000, tenable for one year with possibility of reëlection for a second year. The holder of the Fellowship is required to undertake such investigations as shall demand a combination of study in the hospital wards with research in the pathological department of the university. Candidates, who must be graduates of a recognized medical school, are requested to indicate the line of work they propose to undertake, if elected, and to afford evidence of original research already accomplished. Applications should be forwarded to Professor J. G. Adami, McGill University, Montreal, on or before February 15th, 1912.

THE quack is not a local manifestation, either in place or in time. He flourishes in far-off Australia as well as in Canada, and no efficient means have yet been devised for checking his vicious activity. From the *Australian Medical Journal* of September 2nd we learn that a committee had been appointed to examine the claims of a notorious cancer curer. It appears that the committee has issued a report recommending that the board of health register the names of all unqualified healers, and that all quacks should publicly notify all cases they are attending. As the *Australian Journal* points out, this measure would merely give rise to new evils. Registration would create a new order of practitioners under shelter of the law, and notification would signify to the patient that his treatment had the sanction of the authorities. The common sense of the matter is, as that journal points out, that in the practice of healing, as in any other calling, fraud should be punished under the provisions of the criminal code, whether it is perpetrated by a qualified or unqualified practitioner.

Book Reviews

CASE HISTORIES IN NEUROLOGY. By E. W. TAYLOR, A.M., M.D.
305 pages, with illustrations; price, \$3.00. W. M. Leonard,
Publisher, Boston.

Upon a previous occasion, namely, in August, mention was made of "Case Histories in Pediatrics," by Dr. John Lovett Morse, of Boston; and the present volume devoted to "Case Histories in Neurology," by Dr. E. W. Taylor, of Harvard, appears to be devised upon the same plan. Actual cases are cited to illustrate diseases and symptoms; and they are recorded under the usual headings, peripheral, spinal cord, brain diseases, unclassified, and neuroses. These cases are excessively interesting. They are set forth with rare skill, without incidental or extraneous matter, exactly as cases should be recorded. We commend this series to students and to examiners in medicine. No means could better be employed to test a student's knowledge. There are few cases of nervous diseases falling under the attention of a physician, which could not be diagnosed by reference to this book.

PROGRESSIVE MEDICINE. Edited by HOBART AMORY HARE, M.D.,
assisted by LEIGHTON F. APPLEMAN, M.D., December 1st,
1911. Lea & Febiger, Philadelphia and New York, \$6.00
per annum.

The opening article in this volume deals with the diseases of the digestive tract and allied organs, namely, the liver, pancreas, and peritoneum, by R. S. Lavenson. The second article is upon diseases of the kidney, by John Rose Bradford. The third is by Charles W. Bonney, upon genito-urinary diseases. The surgical section is in charge of Joseph C. Bloodgood, who writes upon the surgery of the extremities, shock, anæsthesia, infections, fractures and dislocations, and tumours. A most valuable feature of the volume is a practical therapeutic referendum by H. R. M. Landis, occupying fifty-five pages. The various therapeutic measures are set forth in alphabetical order. Each receives a comprehensive annotation, and the whole may be taken as a just estimate of the place which each of these measures occupies in medicine at the moment.

EMERGENCIES OF GENERAL PRACTICE. By PERCY SARGENT, M.B., B.C., F.R.C.S., Surgeon to Out-patients, St. Thomas's Hospital, and, ALFRED E. RUSSELL, M.D., B.S., F.R.C.P., Physician to Out-patients, St. Thomas's Hospital. New second edition; 454 pages; illustrated; \$4.50. London: Oxford Medical Publications; Toronto: D. T. McAinsh & Company.

It seems scarcely proper to include in emergencies of general practice, which can be summarily dealt with, such grave accidents as may require removal of an eye, for example; and yet this book gives in less than thirty lines directions for performing that somewhat difficult operation. A man who knows how to excise an eye does not require these directions; and one who should attempt the operation with only such information as this book affords would be liable to find himself in difficulties of various kinds. The book is really a treatise on medicine and surgery, and so large a subject must receive fragmentary or even misleading treatment in a work of moderate compass. Every qualified practitioner is expected to be able to deal with emergencies, though a book might well be written for his instruction; and we would suggest for a title, "Till the Specialist Comes."

DISEASES OF THE EYE AND THEIR TREATMENT. By SIR HENRY R. SWANZY, A.M., M.D., D.Sc., and LOUIS WERNES, M.B., F.R.C.S.I. Tenth edition, with illustrations. H. K. LEWIS, 136 Gower Street, London, W.C., 1912.

This is the first book bearing the date, 1912, which we have had the privilege of seeing, and by a curious chance it is the tenth edition of "Swanzy on the Eye." Men who are now old will remember that one of the earlier editions was much prized in their student days. It has always been a standard text-book and is yet as strong and vigorous as ever. For the first time coloured figures have been introduced, which shows how times are changing. They are beautifully drawn and well printed, save for an error in the legend on plate vii, which the correction by hand makes more obvious. This old friend in spite of its new dress is always welcome.

Books Received

The following books have been received, and the courtesy of the publishers in sending them is duly acknowledged. Reviews will be made from time to time of books selected from those which have been received.

HEART SOUNDS AND MURMURS. By E. M. BROCKBANK, M.D. (Vict.), F.R.C.P., illustrated. H. K. Lewis, 136 Gower St., London, W.C., 1911.

MEAT HYGIENE. By RICHARD EDELMANN, Ph.D.; translated by J.R. MOHLER, A.M., V.M.D., and ADOLPH EICHHORN, D.V.S.; 152 illustrations and 5 coloured plates. Lea & Febiger, Philadelphia and New York, 1911.

THE PRACTITIONER'S VISITING LIST, 1912. Lea & Febiger, Philadelphia and New York, 1911.

STUDIES IN PULMONARY TUBERCULOSIS. By F. G. GRIFFITHS, B.A., M.D. Baillière, Tindall & Cox, London. Price, 5s. net.

PROGRESSIVE MEDICINE. Edited by HOBART AMORY HARE, M.D., assisted by LEIGHTON F. APPLEMAN, M.D. December 1911. Lea & Febiger, Philadelphia and New York. \$6.00 per annum.

SCIENTIFIC FEATURES OF MODERN MEDICINE. By FREDERIC S. LEE, Ph.D. Columbia University Press, New York. Price, \$1.50 net.

CASE HISTORIES IN MEDICINE. By RICHARD C. CABOT, M.D. Second edition, revised and enlarged. W. M. Leonard, Boston, 1911.

AIDS TO OPHTHALMOLOGY. By N. BISHOP HARMAN, M.A., M.B. Fifth edition. Baillière, Tindall & Cox, London, Eng. 100 illustrations. Price 2s. 6d. net.

Res Judicatæ

PRESENT KNOWLEDGE OF DUODENAL ULCER

THE comparative frequency with which this condition is now known to occur has given it an importance that formerly it did not possess, so that it demands our most careful consideration. The position of the practitioner at the present time would seem to be a rather puzzling one, when called upon to decide between the contentions of the more aggressive school of surgeons represented by Moynihan and his followers on the one hand, and those of more conservative clinicians on the other. The brilliant work of Moynihan, coupled with his incisive, even dogmatic, style of exposition, has given his views a wide prevalence. He contends that the diagnosis of duodenal ulcer is a relatively simple matter—may be made with precision in from ninety to ninety-five per cent. of cases—that, as regards the symptomatology, severe recurrent hyperchlorhydria is duodenal ulcer; that he never operates for duodenal ulcer without finding it; and that hæmatemesis and melæna are complications and not essential to the diagnosis. The condition is claimed to be almost exclusively surgical. These views have aroused much criticism, and recently Kemp, of Copenhagen, has joined issue with Moynihan. Analysing the individual symptoms Kemp shows that none is characteristic.

1. The chief symptom, "hunger pain," is shown to have been described more correctly by the French as one of the important symptoms in what they call the "*syndrome pylorique*," met with in ulceration at or near the pylorus. But as to whether the ulcer is proximal or distal to the pyloric orifice "hunger pain" alone is no indication. Ewald considers it to be a symptom merely of hyperchlorhydria, but it is extremely rare without ulceration. Kemp and Harslof give operative findings supporting this opinion. Exceptionally it appears that gall stones or appendix disease may give rise to typical "hunger pain."

2. The constant localization of pain on the right side of the middle line above the umbilicus is in favour of duodenal as against gastric ulcer. Of fifty cases of gastric ulcer the pain was on the right side in only two. Moynihan lays little stress on this point.

3. The periodicity of the pain is said by Kemp to be the most

characteristic symptom, and is much more pronounced than in gastric ulcer. Yet Patterson, of London, and others have met with this periodicity and failed to find any evidence of ulcer. In many cases the ulcer may be latent, until suddenly perforation or hæmorrhage may occur. More often latency is periodic, intervals of complete freedom from symptoms alternating with attacks of pain. The intervals may vary from days to weeks, and are more apt to occur in the summer time.

4. Hæmatemesis and melæna are considered by Moynihan to be complications rather than symptoms of duodenal ulcer, as they occur at a late state of the disease, and should be preventable by timely operation. But they have been shown by Moynihan himself and others to occur also in disease of the appendix, and by the Mayos' statistics, to occur, though rarely, in gall-stone disease. A history of hæmatemesis or melæna, or both, is obtained in about one-third of all cases. But if occult blood is repeatedly examined for, it is found in a much larger proportion. The discovery of occult hæmorrhage is important as it *almost* excludes disease outside the digestive tract, such as cholelithiasis or nephrosithiasis. Thus none of these symptoms is pathognomonic of duodenal ulcer. It is the presence of several of them together that counts. Kemp calls attention to the neglect of one form of objective examination; namely, that of the chemistry of gastric secretions and of gastric motility. He refers to the work of Rubow, which seems to indicate that hypersecretion, either digestive or continuous, is rather characteristic of duodenal ulcer. By digestive hypersecretion he means the presence of an abnormally copious (more than 120 cc.) and acid (total acidity exceeding 80) fluid in the stomach one hour after a test meal. By continuous hypersecretion he understands the constant presence of more than 50 cc. of strongly acid fluid in the fasting stomach. As regards the motor function, Günsberg and Kemp have independently shown that more or less motor insufficiency is common, if not the rule, in duodenal ulcer, although, owing to the frequency of the symptom in gastric ulcer (80 per cent.) it is of little value in diagnosis except to exclude functional dyspepsia or extra-gastric disease. Another motor anomaly common in duodenal ulcer is pylorospasm, which may lead to stagnation of food, severe pain, and attacks of uncontrollable vomiting.

Moynihan's contention as to the ease of diagnosis is refuted by the data of other prominent operators. Of one hundred and forty-one tabulated histories reported by C. Graham from the Mayos' clinic, two-thirds of the cases were fairly diagnosed; 10 per cent.

were called gall stones; 14 per cent. were thought to be either duodenal ulcer or gall stones; in about 9 per cent. the diagnosis was not stated, or they were variously diagnosed as one of three or four different ailments. Again, Saltau Fenwick's statistics are interesting. In one hundred and twelve consecutive cases of hypersecretion (sic) operated on by Patterson and others

Chronic ulcer of the stomach alone existed in.....	13 cases.
Chronic duodenal ulcer.....	46 "
Gall stones.....	12 "
Disease of the appendix.....	22 "
Gastric and duodenal ulcer co-existed in.....	3 "
Duodenal ulcer and gall stones.....	3 "
Gastric ulcer and diseased appendix.....	3 "
Duodenal ulcer and diseased appendix.....	5 "
Cancer of the pylorus existed alone in.....	4 "

Thus, observes Fenwick, it is clear that chronic hypersecretion is not a disease, but merely an expression of an organic lesion of some part of the digestive tract, or of those organs that pour their secretion into it, and while most cases may be accounted for by the presence of gall stones, gastric or duodenal ulcer, or a diseased appendix, he believes that further experience will show that pancreatic calculus and cancer and tubercle in the region of the cæcum can also induce the gastric disorder. Consideration shows that the chief source of diagnostic confusion is gastric ulcer, especially when situated at or near the pylorus. Kemp thus summarizes the chief differential points that indicate duodenal ulcer:

1. It affects chiefly males;
2. The marked periodicity of symptoms;
3. The occurrence of pain or gas or both (Graham) two to four hours after food;
4. The localization of pain to the right of the umbilicus;
5. Repeated melæna or persistent occult hæmorrhage without hæmatemesis;
6. The presence of unusually high degrees of digestive and continuous hypersecretion;
7. Frequent severe attacks of pylorospasm.

Gastric ulcer situated without the pylorus will seldom cause difficulty of diagnosis. Of extra-gastric affections the most likely to simulate duodenal ulcer is cholelithiasis. This is more frequent in females than in males. Of great diagnostic value is manifest or occult intestinal hæmorrhage, which practically never occurs in cholelithiasis. Gastric motor insufficiency, hypersecretion, and pylorospasm are rare in cholelithiasis. Icterus is not decisive, as

it is absent in 50 per cent. of cases of cholelithiasis, and may occur in duodenal ulcer (eight times in one hundred and eighteen cases according to Oppenheimer). Disease of the right kidney, and especially nephrolithiasis, is more easily excluded, though the x-rays and catheterism of the ureters may be required. Chronic appendicitis and diseases of the colon may produce periodic attacks of pain, localized in the right hypochondrium or epigastrium, but the characteristic connexion with food is usually absent. Again, though gastric hypersecretion may depend on chronic intestinal disease, retention of the gastric contents and pylorospasm are usually absent. (Kemp, of Copenhagen, in *Zeitschr v. Klin. Med.*)

Two remaining points deserve mention in the direct diagnosis. G. Herschell, of London, has shown that the Cammidge pancreatic reaction is helpful. Robson and Cammidge mention that chronic pancreatitis often follows duodenal ulcer. Pancreatitis unaccompanied by jaundice is most commonly due to the extension of a duodenal catarrh along the pancreatic ducts, which implies a source of irritation in the duodenum. In a case presenting the characteristic pain coming on some time after a meal, the knowledge that such is present would justify us in assuming the presence of a duodenal ulcer. In like manner the absence of the pancreatic reaction would show us that there was no duodenal catarrh, and would incline us to the possibility of the trouble being of a functional nature. Moynihan states that the anamnesis is everything, and the physical examination relatively nothing. The writer has found the combination of two signs of value in an occasional case; namely, slightly increased tension of the right upper rectus and slight exaggeration of the right epigastric reflex. Touching the greatly increased risk of hæmorrhage and perforation in duodenal as compared with gastric ulcer, claimed by some surgical authorities, W. Mayo's statistics (St. Mary's hospital reports) are worthy of note. In one hundred and eighty-eight operations for duodenal ulcer, the indication for operation is perforation in only 5.3 per cent. According to Harslof, perforation occurs in 9 per cent. of all cases of gastric ulcer; and, according to several statistics of necropsies, in as many as 15 per cent. Though hæmorrhage occurs in about 30 per cent. of all cases of duodenal ulcer, it is slightly more frequent in gastric ulcer, and the claim that duodenal hæmorrhage is more fatal than gastric has not been proved. Hence, there appears to be no more justification in operating in every case of duodenal than in every case of gastric ulcer. In both, internal treatment should be the routine method, and operation resorted to

only in case of necessity. In both the indications for operation are similar. They include:

1. Stenosis;
2. Chronic hæmorrhage, manifest or occult, which does not yield to internal treatment;
3. Repeated severe attacks of pylorospasm;
4. Where the above complications are absent, failure to obtain a satisfactory result by medical means, or the rapid occurrence of a relapse.

The safest position for the practitioner to-day would appear to be one of advanced conservatism. He must recognize that the so-called nervous dyspepsia and functional secretory disorders of the stomach have, in the great majority of cases, some organic cause as their basis, either in the digestive tract or outside it; that duodenal ulcer is one of the conditions that is always to be considered in the presence of hyperchlorhydria, hypersecretion, or a combination of the two; that the diagnosis, often a comparatively simple matter, may present great difficulties, but, since most of the conditions with which it is likely to be confused also require surgical treatment, operation can be more freely advised and undertaken than if it were otherwise. That functional hyperchlorhydria may finally disappear as a clinical entity is possible, even probable; but, that "severe recurrent hyperchlorhydria" is duodenal ulcer, can hardly be conceded; that it may ultimately result in duodenal ulcer seems very likely. That its discovery should necessarily suggest prompt surgical interference, except in the presence of such definite indications as have been mentioned, would drive both the public and the profession to a *non-possumus*. Thus the contentions of Moynihan, in particular, seem to be too sweeping, and neither in diagnosis, prognosis, or treatment are we, as yet, in as assured a position as they would suggest.

Whilst freely acknowledging the debt which clinical medicine owes to Moynihan and his surgical *confreres* in the condition under discussion, it seems to the writer that their dicta are too sweeping; and that neither as regards diagnosis, prognosis, or treatment are we, as yet, in quite so assured a position as these would suggest.

Halifax

W. BIRT

Men and Books

BY SIR WILLIAM OSLER

IV. JEAN ASTRUC AND THE HIGHER CRITICISM. It is strange how the memory of a man may float to posterity on what he would have himself regarded as the most trifling of his works. Ask in succession a score of doctors, "Who was Astruc?" and the expression aroused indicates that at least in our profession he is "clean forgotten as the dead man out of mind"; and yet librarians and dealers in second-hand books know only too well what a prolific writer he was in the first half of the eighteenth century. But ask any theologian, any man interested in the history of the Bible, the same question, and his face at once brightens,—or darkens,—as he replies, "Oh, Jean Astruc, he was the father of modern biblical criticism." And so it is that the man whom we have forgotten, who cut such a figure in the profession at Montpellier and Paris, the enumeration of whose tomes extends through three pages in the "*Biographie Médicale*," is remembered to-day by a small octavo volume, published anonymously in Brussels, 1753, with the title, "*Conjectures sur les Memoires Originaux dont il paroît que Moyse s'est servi pour composer le Livre de la Genese. Avec des Remarques, qui appuient ou qui éclaircissent ces Conjectures.*"

Interested in Astruc for some years, having had occasion to refer to his splendid work on the history of syphilis and to his history of the Montpellier faculty, and incidentally knowing his position as the founder of the criticism of the Pentateuch, I had long tried to get the above named volume, which I had never seen advertised in any catalogue. It turned up the other day at Sotherbys in the Huth collection. I sent a bid to Quaritch with the admonition "not to lose it"; and as the book is of great rarity I expected to pay a reasonably high price; but, illustrating the hazard of the auction room, no one seemed to know of it and it fell to me for a few shillings.

The story of Astruc's medical life is fully given in Bayle's "*Biographie Médicale*." His position in modern theology may be gleaned from an eight page article in the recent "*Real Encyklopädie für Protestantische Theologie*." In Genkel's "*Encyklopädie*" Baentsch says, "from the appearance of this book dates the fruitful criticism of the Pentateuch. That in the following century its

problems have been solved is owing to Astruc, the significance of whose work is assured for all time. The year 1753 in which the book appeared is a milestone in the history of the science of the Old Testament."

Though published in 1753, it was composed some time previously, but the author hesitated to publish lest "*les pretendus esprits forts*" should regard it as lowering the authority of the Pentateuch; but a learned and religious friend overcame his scruples, urging that the arrangement of Genesis in parallel columns according to its sources would be no greater change than was its division into chapters and verses.

Of the two ways by which Moses could have had his information, oral tradition, "*de bouche en bouche*," or by written documents which had been handed down, the first was regarded as most probable; but in spite of the fewness of lives, owing to the longevity before the Flood, which lent weight to this view, Astruc believed there were insuperable objections to it. A study of the documents forced the conclusion that Moses had access to many ancient documents describing the world since the creation, coming from different sources and varying in detail. He patched them together one after another, thus forming the book of Genesis as we have it. Only in this way could the repetitions and contradictions be explained. But Astruc's notable discovery was the recognition that in Genesis there are two separate accounts of the Creation and of the early days of the world, the one extending as far as verse 3 of Chapter II, in which the Creator is spoken of as *Elohim*, the other extending from verse 4 of Chapter II to the end of Chapter IV, in which the Creator is called *Jehovah*. These accounts differ in important details, particularly in the fact that in the Javistic account no mention is made of the sin of Adam, which plays so important a rôle in Pauline Christianity. Astruc recognized other sources, and prints in parallel columns under A, B, C, D, the four most important, which he had worked out as far as to the end of Chapter II of the Book of Exodus.

The work is a small octavo volume, extending to 525 pages, fully one-half of which is taken up with a critical consideration of his views. Small wonder that in 1753 the distinguished physician to the king, and professor in the Paris faculty, published such a work anonymously, and in Brussels.

V. TWO FRENCHMEN ON LAUGHTER. Like song that sweetens toil, laughter brightens the road of life, and to be born with a sense

of the comic, is a precious heritage. So much do we differ in the possession of this faculty, that a twentieth century explanation would seek for differences in quantity or quality of some internal secretion which stimulates the phrenic centres. Or one may prefer the view of Aristotle, who describes the diaphragm (phrenes) as a membrane which when overheated by tickling, so "disturbs mental action as to occasion movements that are independent of the will." In any case, the close connexion believed to exist between the mind and the diaphragm is still suggested to us by the anatomical term "phrenic nerves." We owe to Aristotle the first study of the physiology of laughter, and the recognition of it as a faculty peculiar to man.

Having always held with that philosopher who regarded a day wasted in which he had not had a good laugh, I eagerly read Bergson's "Laughter, an Essay on the Meaning of the Comic" (Macmillan & Co). What a delightful gift to be able to make smooth the rough places of psychology! With not a dry page, full of thought so clearly expressed and so happily illustrated, and not too long, the book is a model of clear presentation. And yet, to take the end first, philosopher like, he reaches a lame and impotent conclusion at which my Democritean soul rebels; for the final comparison of laughter is with the froth of which a child picks up on a sandy beach a handful, sparkling like gaiety itself, but to the taste the substance scanty and the after taste bitter!

Indifference, absence of feeling, Bergson says, is the natural environment of laughter, which always has a social signification. The trivial mishap that raises a laugh is associated with a mechanical inelasticity—a lack, through failure of mind or of muscle, of adaptability, and the living pliability of a human being. The eccentric in action, at whom we laugh, lacks in character that tension and elasticity which social life brings into play, and upon which its success depends. "The rigidity is the comic and laughter is its corrective." And it is the same with gestures, attitudes and movements of the body, which are comic "in exact proportion as the body reminds us of a machine." So too, the ludicrous in words comes out when an absent idea is fitted into a well-established phrase, as when a lazy lout says, "I don't like working between meals," which has nothing amusing in itself, but only in connexion with the commonplace phrase, "one should not eat between meals." Protecting itself by laughter, society demands that each member shall be attentive to his social surroundings—he must fit himself to the environment. A comic in character is one who "automatically

goes about his own way without troubling to get himself in touch with the rest of his fellows, and it is by laughter we reprove his absent-mindedness and waken him out of his dreams." These hurriedly noted points, taken almost at random, may serve to indicate the rich treat in store for any one who wishes to follow the workings of one of the ablest minds of our generation. The title suggests *Punch* or *Life* in the hands of a vivisector, but instead we find humanity in the retort of a chemist of the soul, and the analysis is presented in formulæ of easy comprehension by the plain man.

How scanty the literature on laughter is shown by a glance at the index catalogue of the Surgeon-General's Library. Excluding a few theses and, in series II, reference to papers on spasmodic and uncontrollable laughter, there is mention of three or four monographs, one of which is the only elaborate treatise ever written on the subject—"Traité du Ris, par M. Laur. Joubert, Paris, 1579"—a work noted by Brunet as "recherché à cause du Dialogue sur la Cacographie." Such a contrast to Bergson! We are in another world, with other thoughts, strange terms, and an anatomy and physiology still dominated by Galen. A treatise weighty with authorities, and interspersed with illustrations drawn from Hebrew, Arabic, Greek, and Latin authors, it has, as Brunet remarks, a curious value, apart from the subject-matter, as Joubert was one of the earliest advocates of phonetic spelling, in which style the work is printed, and there is an appendix, "Dialogue sur la Cacographie Française." Laughter is discussed in three sections, in the first of which the material is analyzed, and it is interesting to find the same basic elements as given by Bergson, absence of feeling and some mishap or unseemliness—"laideur et faute de pitié"—as when an old fellow plays in the street like a child, or when a gaily dressed beau tumbles in the mud. There are many shrewd comments on the comic in words and in situations. He has great difficulty in placing the risible faculty, but after a long disquisition on the brain and mind it is finally localized in the heart itself. The mind first perceives the ridiculous and it is communicated at once to the heart by the nerves, as by vessels,—“the swift thought,” in Shelley's phrase, “winging itself to laughter.” The intimate relation of the diaphragm with the heart explains why this structure is the organ of laughter, and one reason why man alone among animals possesses this faculty is the wide extent of the attachment of the human pericardium to the diaphragm.

Various chapters treat of the movements of the face and mouth, the scintillation of the eyes, the tears, the redness of the face, the

shaking of the shoulders and of the body, the pain in the abdomen and the loss of sphincter control. In the second book he considers the definitions given by authors, and the different species of laughter, and the reasons why men laugh when the diaphragm is wounded. His own definition may be quoted, and it illustrates the phonetic spelling. "Le Ris et un mouvement, fait de l'esprit epandu, et inegale agitation du cœur qui epanit la bouche ou les laivres, secoüant le diaphragme et les parties pectirales, avec impetuosité et son autrerompu par lequel et exprimée une affection de chose laide, indigne de pitié." Whether man is the only creature which laughs, on the men who have neither wept nor laughed, on the influence of the spleen, why one melancholic laughs and another cries, whether a baby smiles before the fortieth day, why great laughers grow fat, on those who have died laughing—are among the subjects considered in Book III.

Joubert, who lived in the palmy days of the Montpellier school, and succeeded his old teacher, the famous Rondelet, wrote many works, among which the most celebrated were the treatises on gun-shot wounds and on vulgar errors. From the latter it is not unlikely Sir Thomas Browne had the suggestion for his work on the same subject.

I cavilled at Bergson's conclusion,—that like sea-froth the substance of laughter is scanty and the after taste bitter. It is not always so. Joubert is right. There is a form that springs from the heart, heard every day in the merry voice of childhood, the expression of a laughter-loving spirit that defies analysis by the philosopher, which has nothing rigid or mechanical in it, and is totally without social significance. Bubbling spontaneously from the artless heart of child or man, without egoism and full of feeling, laughter is the music of life. After his magical survey of the world in the "*Anatomy of Melancholy*," Burton could not well decide, *fleat Heraclitus an rideat Democritus*, whether to weep with the one or laugh with the other, and at the end of the day this is often the mental attitude of the doctor; but once with ears attuned to the music of which I speak, he is ever on the side of the great Abderite, and there is the happy possibility that, like Lionel in, I think, one of Shelley's poems, he may keep himself young with laughter.

Retrospect of Medicine

AURICULAR FIBRILLATION. THE SCHORSTEIN LECTURES. BY JAMES
MACKENZIE, *Brit. Med. Journ.*, 1911, II, 869.

THE discovery of auricular fibrillation of the heart is the most important yet made in the domain of functional pathology. While the symptoms due directly to the fibrillation, or due to the heart failure induced by it, form a definite clinical entity, few physicians are aware of its existence. About 60 or 70 per cent. of all serious cases of failure of the heart are due to it; and in its recognition we have a sure foundation for diagnosis, prognosis, and rational treatment: "The most common evidence of the condition is serious irregularity of a very disorderly kind." This form of irregularity is seen most frequently in senile hearts and in those due to rheumatic infections. It is seen also in most cases of dropsy and dyspnoea with irregular pulse. While we realize that its recognition is of the greatest importance clinically, we must remember that the discovery of auricular fibrillation is due to the correlation of clinical observation, graphic records, and the results of experimental research. This observation has reached such a point that no longer are these exact methods necessary for its detection. By polygraphic records we have information of the action of two or more of the chambers of the heart, and in one group of cases it is to be noted that the "a" wave—that caused by the auricular contraction—is absent. From the knowledge gained at autopsy that the auricles in such cases were generally hypertrophied (and therefore must have been contracting), the author came to the conclusion that the auricle and ventricle contracted simultaneously, and in response to a stimulus from the auriculo-ventricular node. This he designated nodal rhythm. But while Cushny was the first to suggest that the disorderly, incoherent contraction of the various muscle fibres, that we now call auricular fibrillation, might be a clinical factor of importance, it remained for Lewis with the electro-cardiogram to show that the cause of the disappearance of the "a" wave and so the onset of the disorderly irregularity, was actually auricular fibrillation. When an auricle fibrillates it remains in diastole, but close inspection shows numerous undulatory contractions that accomplish nothing. Should this fibrillation be carried over to the ventricle, the circula-

tion ceases at once. Clinically it may be produced by malnutrition of the heart, by digitalis in certain circumstances, by infectious diseases, by effort. In the hearts examined there has been an increase of fibrous tissue in the walls of the auricle and ventricle, though Draper (*Heart*, 1911, III, 13) has described a case where this fibrosis was limited to the sino-auricular node. In the majority of cases, once instituted the fibrillation persists till death, perhaps for ten years or more, but many cases of paroxysmal tachycardia owe the onset to numerous attacks of fibrillation lasting only a few moments.

Normally the ventricle receives its impulse to contract from the sino-auricular node through the auricle. When the latter is fibrillating, the ventricle receives many disorderly impulses and the rate increases, the heart becomes irregular, and in the great majority of cases the heart increases in size. Naturally the heart becomes unequal to the task before it; then dyspnoea, palpitation, cedema, cyanosis, and enlargement of the liver rapidly develop in proportion to the severity of the symptoms, and to the cause. This is only to be expected when one remembers that the auricle normally regulates the flow of blood to the ventricle and stimulates it to regular, efficient contractions.

While not confined to cases of auricular fibrillation, it is in this series of patients that digitalis accomplishes the most good. With rare exceptions all cases, where the rate was slowed, were of auricular fibrillation. For example, cases of mitral stenosis with fibrillation were remarkably slowed, whilst the drug had little effect upon cases that, having the same pulse rate, showed no fibrillation. When digitalis itself produces the fibrillation the rate is very much slowed.

The patient is most frequently aware of the onset of the fibrillation by the fluttering sensation in the chest, but this sensation differs from that experienced in paroxysmal tachycardia, in that in the fibrillation there is a frequent occurrence of larger beats. Most readily the observer can recognize fibrillation by the character of the pulse, which has been described as disorderly irregular. The irregularity has no distinctive character, such as is found in the irregularity of the young due to respiratory changes, or in the extra-systolic type, where the normal rate is interrupted by extra systoles or where there is an extra systole following each beat.

In cases of mitral stenosis with a typical presystolic murmur and a diastolic murmur due to the obstruction of the stream of blood at the end of ventricular systole, the onset of fibrillation will be characterized by the disappearance of the presystolic murmur, but

not of the diastolic. For the diastolic is due to an actual narrowing of the orifice and the presystolic to the auricular contraction, and when the auricular contraction disappears, as it must in fibrillation, it is perfectly plain that the murmur resulting therefrom will disappear also. The pulse may in such cases, under the action of digitalis, be slow and even regular, but the presence of the diastolic with the absence of the presystolic is almost pathognomic of fibrillation in mitral stenosis.

The symptoms of heart failure are those of failure in general, and, while generally slow in onset, may occur within a few hours after the fibrillation is established. Angina pectoris has not so far been observed. The prognosis must be made upon the effect the ensuing symptoms of heart failure has on the individual. It must be remembered that fibrillation is a sign of disease of the musculature; factors influencing the prognosis are the individual's ability to so reduce his daily life's work that he may be able to live within the limits of his heart, the duration of symptoms, the character of the murmurs in mitral stenosis, the degree of dilatation, and the pulse rate.

There is probably no type of heart disease in which digitalis has so much effect as here. The heart is bound to fail sooner or later if the ventricular rate is over ninety or so, whilst the failure will be much more rapid if the rate is one hundred and twenty or above. Digitalis should be given till the therapeutic effect is obtained, then discontinued for a few days, and resume if the rate rises in such small doses that the rate will be under seventy, or even fifty, if the patient feels better then. When he is up and about, if the rate goes above ninety or even eighty, it is better to have him under the digitalis influence. He will quickly learn the benefit that he is deriving from the drug, then the administration can be left in his hands. MacKenzie has found no particular preparation of outstanding benefit. The tincture, if given in doses of fifteen to twenty minims up to a drachm a day, and continued till there is marked slowing of the pulse or digestive disturbance, is very good. When this therapeutic effect is obtained, the drug is stopped for a few days, then resumed in half doses if the rate shows signs of increasing. In very urgent cases strophanthin intravenously may be of advantage.

RECENT PAPERS ON COMA, ESPECIALLY DIABETIC COMA

IT has been known for many years that coma in diabetes occurred in a definite time relationship with changes in the output

of large amounts of organic acids in the urine. Lately several observers, mostly French, have studied that condition from an experimental side with very interesting results. Labbe and Trolle (*Presse Med.*, 1911, XIX, 284) after showing that the various mineral acids either did not produce coma, or killed too quickly to permit of accurate observation, produced coma by the injection of propionic, lactic, butyric, and beta-oxybutyric acids. Part of the toxicity is due in each case to the acid content, and part to the specific chemical constitution of the acid; and it is noteworthy that the acids containing the alcohol radicle are less toxic than those without. The first toxicity (that of the acid) can be inhibited by the free administration of alkalies, among which sodium bicarbonate is the preferable. If three hundred and seventy-five grains of soda butyrate is a lethal dose, that of the acid itself is about ninety. Alcohol should also be freely given, because of the fact before stated that the acids with it in their constitution are less toxic than those without. Not only do Sicard and Salin (*Bull. et Mem. Soc. Med. D. Hop de Paris*, 1911, XXXVIII, 854), advocate the use of the bicarbonate in coma, but also in pruritus. But remembering that in coma it may be as imperative to avoid raising the blood pressure by the administration of too large quantities of fluid, they advise that the solution be made much more concentrated, as high as 9 or 10 per cent. instead of 3 per cent. This solution is given intravenously in amounts up to 250 c.c., and, on account of it being so caustic, care must be exercised that none gets into the tissues. Balint (*Berlin. klin. Woch.* 1911, XLVIII, 1580) recommends giving sugar solution per rectum, because not only is sugar better utilized in the portal than in the general circulation, but also because of the well-known anti-ketone properties of the sugar when so absorbed.

Porges (*Wien klin. Woch.* 1911, XXIV, 1147) considers that acidosis is much more common than supposed, and that the intoxication may be due to over accumulation of acids, to a deficiency of alkalies, or to an insufficient output of acids. Increased breathing, whether in the rate or in the amount of breath taken in at each breath, is an invariable sign of acidosis. This is because the respiratory centre is very sensitive to acids and the increased breathing is an effort to relieve the too acid content of the blood. The absence of increased breathing is sufficient to eliminate acidosis (whether diabetic or otherwise) as a cause of coma, where no history is to be obtained. Labbe, at the meeting of the French Internists (*Jour. Am., M.A.*, 1911, LVII, 1849) notes that, whereas in the normal individual one hundred and forty grains of soda are sufficient to

render the urine alkaline, in the diabetic threatened with acidosis very much larger quantities are necessary, and that although the detection of beta-oxybutyric acid is the important feature no bedside test has so far been described. The only reliable tests so far are for acetone and diacetic acid. The clinical signs are often passed by unperceived owing to their want of completeness. Many cases terminate fatally without the fruity odour to the breath described by the old clinicians. He, too, strongly advocated the rigorous employment of sodabarbonate intravenously giving, as much as twenty-five grms. or one ounce.

ISOHÆMOLYSINS AND ISOAGGLUTININS AND THEIR RELATIONSHIP TO BLOOD TRANSFUSION

THE value of blood transfusion as a method of treatment is still very problematical. This method, however, should, in view of our recent knowledge of the subject of isohæmolysis and isoagglutination, be more carefully studied before being cast aside.

In 1892 Maragliano showed that the blood serum of certain patients was capable of hæmolysing the corpuscles of certain other patients when both serum and corpuscles were mixed *in vitro*. Later, Landsteiner and Shattock, working independently, found that the serum of one patient agglutinated the corpuscles of certain other patients. These substances, present in sera which are capable of hæmolysing or agglutinating the corpuscles of the same species, have been called isohæmolysins and isoagglutinins in contradistinction to the heterohæmolysins and heteroagglutinins present in the sera of certain animals and active against the corpuscles of certain other animals of a different species.

The first careful study of the isoagglutinins was made by Landsteiner. He showed that their occurrence in different sera followed a definite law and that this occurrence was of no pathological significance. In a later investigation of the isohæmolysins, he came to a similar conclusion.

In America our interest in the subject of isohæmolysis was awakened a few years ago by the work of Crile on blood transfusion and his studies on the occurrence of isohæmolysins in patients suffering from carcinoma and tuberculosis. As pointed out by Moss, the large percentage of sera found by Crile showing isohæmolysis was due to his examination of too small a number of sera and corpuscles at one time. Crile found isohæmolysins present in 82-92 per cent. of cases of carcinoma and tuberculosis, and ascribed to this definite diagnostic significance.

From investigations on a rather large number of healthy and diseased patients, Moss and more recently Grafe and Graham, have shown that the occurrence of isohæmolysins is of no diagnostic importance, thus confirming the earlier work of Landsteiner. Further, v. Dungern and Hirschfeld have shown that isoagglutinin characteristics of a blood are transmitted from parents to their children according to the Mendelian law of heredity. These facts, bearing in mind the very close relationship between isoagglutinins and isohæmolysins, are therefore conclusive evidence that no diagnostic importance can be attributed to the finding of isohæmolysins or isoagglutinins in a patient's serum.

Serological studies have demonstrated that there are two isohæmolysins and two isoagglutinins, and that they only react with suitable receptors (using the terminology of Ehrlich) in the red blood corpuscles. To simplify matters these isohæmolysins and isoagglutinins have been called α and β and their suitable corpuscular receptors A and B, i.e., a serum containing the isohæmolysin α only hæmolyses corpuscles containing the receptor A. Grafe and Graham have shown in their investigations on isohæmolysis that all mathematical combinations of the two substances α and β in the serum with their respective corpuscles are possible, but autohæmolysins and autoagglutinins, i.e., when the substance in the serum hæmolyses or agglutinates its own corpuscles, are extremely rare. These authors found, further, that the serum obtained from blood, the corpuscles of which possessed receptors A or B, or both, to which it was not hæmolytic, was capable, when mixed with sera which hæmolysed these corpuscles, of preventing this hæmolysis, i.e., the serum possessed anti-hæmolysins. Although all these experiments were performed *in vitro* it is reasonable to suppose that the same process would occur *in vivo*. It is therefore probable that isohæmolysins are of little importance as a disturbing factor in the transfusion of blood.

The untoward symptoms following transfusion in certain cases are probably due to some other factor than isohæmolysis. According to recent investigations of Ottenberg, these symptoms are apparently caused by intravascular agglutination resulting from the inter-agglutination of the patient's blood with the donor's. He also pointed out that the inconsistency between the very sharp test-tube agglutination and the frequent absence of symptoms following the transfusion of an agglutinable blood was dependent on the quantitative relations between agglutinin and agglutinable corpuscles and non-agglutinable corpuscles. He found that when an excess of

corpuscles having the cell receptor A were mixed with a serum having the agglutinin *a* all the agglutinin was absorbed but no agglutination occurred. This fact therefore explains why untoward symptoms follow transfusion when the patient's serum contains agglutinin for the donor's corpuscles and not when the donor's serum contains agglutinin for the patient's corpuscles. He found also that the presence of a large number of non-agglutinable corpuscles mixed with agglutinable corpuscles and their agglutinin tended to make the clumps of cells found microscopic rather than macroscopic in size. This observation shows how the result of a test-tube experiment of the donor's and patient's blood by not taking into consideration the quantitative relations of the agglutinin and agglutinable and non-agglutinable cells might diagnose a blood as unsuitable for transfusion when the actual transfusion might produce no untoward symptoms. It is of particular interest and value to know that Ottenberg confirmed these experimental observations by the examination of cases which were transfused.

In attempting transfusion, therefore, a suitable donor must be found. This can only be done by examining *in vitro* the blood of the patient and a number of possible candidates as donors. The most suitable blood as donor is one which possesses the same agglutinin characteristics as the patient. This occurs most frequently between parents and children, as was shown by the work of v. Dungern and Hirschfeld. When such a donor is not obtainable, one should be chosen in which the donor's serum contains agglutinin for the patient's corpuscles, because one in which the patient's serum contains agglutinin for the donor's corpuscles would cause intravascular agglutination on transfusion, and, besides producing dangerous symptoms, would probably destroy any therapeutic value the transfused cells might have for the patient. Unless such precautions are taken, previous to transfusion, it is impossible to study satisfactorily the therapeutic value of transfusion.

The following articles contain some of the more important facts on the subject of isohæmolysis and isoagglutination:

- MARAGLIANO—*Berl. Klin. Woch.*, No. 31, 1892.
ASCOLI—*Munch. Med. Woch.*, No. 31, 1901.
LANDSTEINER—*Wein. Klin. Woch.*, No. 46, 1901.
LANDSTEINER & LEINER—*Cent. f. Bact.* Vol. xxxviii, 1905.
MOSS—*Johns Hopkins Hosp. Bull.*, Vol. xxi, 1910.
v. DUNGERN and HIRSCHFELD—*Zeit. f. Immunitätsforschung*, Vol. iv and Vol. vi, 1910.
OTTENBERG—*Jour. Exp. Med.*, Vol. xiii, No. 4, 1911.
GRAFE and GRAHAM—*Munch. Med. Woch.*, Nos. 43 and 44, 1911.

Retrospect of Laryngology

BRONCHOSCOPY AND OESOPHAGOSCOPY. *The Laryngoscope*, St. Louis, September, 1911.

AT the third international laryngo-rhinological congress in Berlin, August, 1911, bronchoscopy and oesophagoscopy were made the subjects of a symposium. Papers by Professor Killian of Berlin, Docent Otto Kahler of Vienna, and Dr. Jackson of Pittsburg, were presented as an introduction to the discussion.

Prof. Killian discussed the advance which has been made in bronchoscopy and the spread of its use, as indicated by the publications which have appeared on this subject. He pointed out that the work represents an important advance, not only in laryngology, but in the entire medical field.

Direct examination of the upper respiratory tract was first developed by Kirstein in 1895, and by Killian in 1896. To the latter really belongs the credit of developing the technique and demonstrating its practical uses. Previous to Killian's work, direct examination of the oesophagus had been in use to some extent, but this work also received a great impetus from the improved instruments and added interest which was aroused. To Killian's former assistants, v. Eiken and Brunings, are due considerable credit, especially to the latter for numerous modifications and improvements in the instruments and technique.

Kahler, of Vienna, in a discussion of bronchoscopy, speaks first of the examination of the larynx by the direct method, and points out that this method has still to receive the full recognition to which it is entitled. He quotes Kirstein who wrote, in 1895: "The new method now enters into competition with the old and its purpose is not to supplant the old, but to supplement it."

The direct method is practically indispensable in the examination of the larynx in infants, but is not by any means essential in adults, where the indirect method is usually quite satisfactory for diagnosis and much less unpleasant. In an adult who does not stand the indirect examination well, the direct method is rarely satisfactory. This must be borne in mind, as it is not a fair test of the method to apply it only to cases where indirect examination has

failed, which implies frequently that the patient will not tolerate manipulation of any kind in the mouth.

While an absolute indication for the direct method is rare in the adult, an absolute contra-indication is just as rare. Certain patients tolerate it badly, a relative contra-indication. It is to be avoided where there is disease at the base of the tongue and dangerous where there is advanced stenosis of the larynx. In these cases even anaesthesia of the larynx is contra-indicated because of the danger of suffocation; if examination be undertaken, preparation for a rapid tracheotomy must be made.

In the new-born, with congenital stridor, autoscropy, or direct examination of the larynx, has explained many cases. In some cases a thyroid and thymus gland has produced tracheal compression, in others it has been found that the soft parts above the cricoid cartilage are drawn downward and forward into the larynx, causing obstruction. Papilloma of the larynx in children is now best treated by this method, which enables the operator in most cases to avoid tracheotomy.

As regards its special use in adults, the direct method is of great value for the accurate determination of the extent of malignant tumours, which is important in deciding what type of operation should be advised. It is also very useful for obtaining sections for microscopic examination. Operations on the larynx by the natural route with narcosis have been made possible by autoscropy. By this method clear vision and the control of hæmorrhage are made possible.

In discussing the examination of the trachea and bronchi he points out that this method has been specially useful in the diagnosis and treatment of *foreign bodies*. In only 7 per cent. of the cases thus far published was it possible to locate the foreign body bronchoscopically, perhaps owing to the faulty technique and unsatisfactory instruments. In the last two years there were only two of 291 cases in which the foreign body could not be located. In 1905 there was 11.5 per cent. of cases reported with faulty diagnosis. He points out that the other methods, especially the *x-ray*, are not to be forgotten.

The results of treatment of foreign bodies in the upper air passages were, prior to the use of this method, very unsatisfactory. Tuffier, in 1897, reported eleven pneumotomies, in ten of which the foreign body was not found; in four cases the operation was fatal. Another observer, in 1903, reporting fourteen cases, with only two successful results. It is not surprising, therefore, that expectant treatment for these cases was advised.

Statistics show that spontaneous expulsion is quite infrequent. Of a series of 1,064 cases, there were only 218, or 20·5 per cent. The mortality of these aspirated foreign body cases was formerly very heavy; one observer records 52 per cent. of 770 cases where no treatment was undertaken. This percentage would be increased if there be added the many patients who died of lung complications caused by unrecognized foreign bodies. The mortality was reduced somewhat by the discovery of the laryngoscope and better treatment of foreign bodies in the larynx. The best series of this period, however, shows a mortality of 30 per cent.

The introduction of bronchoscopy has produced a marked improvement, but the method still lacks the universal recognition which it deserves. Prior to 1896 there were but five cases reported treated by this method; in 1900, 19; in 1904, 36; in 1905, 137; in 1907, 165; in 1909, 304. Kahler has collected in the past two years 291 cases, making a total of 596, and points out that there are probably a number of other cases where foreign bodies were extracted, but not considered worthy of publication. Of 304 cases collected by v. Eiken, forty (13·1 per cent.) terminated fatally, and in the last two years of Kahler's 291 cases there were only twenty-seven fatalities (9·6 per cent.), a very marked improvement over previous methods. The greatest number of deaths occur from lung complications, and this mortality could be lowered if operation were undertaken early.

Of the former series, in 34 cases (11 per cent.) there was failure to remove the foreign body; of the latter, 13 cases (4·5 per cent.), showed a striking improvement in the technic and instruments in the last two years.

The comparative use of upper and lower bronchoscopy has undergone a marked change with the improvement of technique. Lower bronchoscopy, that is to say, examination through a tracheotomy wound, is now rarely used unless there be some special indication, such as severe laryngeal stenosis, or where an attempt by the upper method through the mouth has failed.

The remainder of the paper deals with the various clinical conditions which have been observed and treated, such as anomalies, chronic bronchitis, and bronchiectasis. Several cases of gumma in the bronchi were noted in patients under treatment for chronic bronchitis. The importance of this observation is, of course, evident. Primary tumours were also observed and treated.

Dr. Jackson's paper discussed certain features of œsophagoscopy and gastroscopy. He prefers general anaesthesia, where any

operative work or diagnosis of spastic conditions are to be undertaken; in such cases what is required is relaxation rather than anæsthesia. He points out that the chief danger of the method lies in lack of skill and experience on the part of the operator. The principle of his method of gastroscopy depends on the fact that the upper end of the empty stomach hangs as a tube from the diaphragm and a large portion of its surface can be explored through a straight tube. He increases the area which can be examined by forcing the diaphragm laterally in either direction. He considers that this method can be of considerable aid to the abdominal surgeon by reporting to him the interior appearance of various areas of the stomach wall which, during laparotomy, can be placed before the mouth of the tube.

Obituary

DR. C. CAW died at his home in Parkhill, Ont., December 17th. Dr. Caw was a graduate of Victoria University and was for forty years president of the Parkhill Liberal Association, a member of the school board, and a director of the West Williams Agricultural Society.

DR. I. J. LANE died at Edmonton. Dr. Lane was born in Williamsburg, Dundas County, and graduated in 1886 from Queen's University.

DR. T. G. BRERETON, of Bethany, died December 10th.

DR. EDWIN ELISHER CAMPBELL, JR., died at his home in Brockville, after an illness of two weeks with typhoid fever. Dr. Campbell was born at Royal Oak, Mich., in 1883, and when six months old came to Canada with his parents. Dr. Campbell graduated with honours from Syracuse University in 1909.

News

A CHANGE has been made in the quarantine service at Halifax, under which Dr. Victor N. McKay has been appointed assistant port physician and bacteriologist at a salary of \$1,800 per annum, and residence on Lawlor's Island.

DR. A. S. MOORHEAD, of Toronto, has been awarded the final fellowship of the Royal College of Surgeons.

CALGARY is to have a new isolation hospital. It has not been decided where the building will be located, but if the city is unable to make arrangements with the General Hospital board for the location of the building on the grounds surrounding the General Hospital, it will be placed on the site of the present small-pox hospital, to the north of the city.

A NEW hospital for Lambton County, Ont., is to be erected. It is to accommodate fifteen persons suffering from incurable diseases.

THE new hospital for small-pox patients that is to be erected on Porter's Island, Ottawa, will cost about thirty thousand dollars.

DR. CAULFEILD, pathologist to Gravenhurst Sanitarium, has returned from Vienna.

WORK commenced in the university pathological department in the new buildings of Toronto General Hospital on January 11th.

THE Association of Military Surgeons of Canada meets in Ottawa during the third week of February, under the presidency of Major Le Bel.

THE promoters of a public hospital for Tillsonburg have opened a subscription list with the object of securing \$15,000.

A BY-LAW has been passed in St. Thomas authorizing the city council to raise \$10,000 for the erection of an isolation hospital.

It will probably be built at the west end of Chester Street, but the details have not yet been fully considered.

A NEW hospital, the St. Paul's, will shortly be erected in Vancouver. The building will cost about \$250,000 and will accommodate about three hundred patients and sixty nurses. The hospital is being built under the auspices of the Sisters of Charity of Providence.

THE seventeenth International Congress of Medicine will be held in London from August 6th to August 12th, 1913, inclusive, under the patronage of the king and the presidency of Sir Thomas Barlow. Dr. W. P. Herringham is the honorary general secretary, and may be addressed at 13 Hinde Street, London, W. The subscription price is \$5.00. An applicant, when sending his subscription, should inclose his visiting card indicating his medical qualifications and titles, and his address. Cards of membership will then be sent out. The sections of the congress are twenty-two in number, and in addition there are three sub-sections.

THE eighteenth annual meeting of the Royal Victoria Hospital was held in Montreal on January 23rd. It was decided to commence operations on an extension, which will provide for sixteen additional rooms, to meet the increased demand for private accommodation. Sir Edward Clouston, the president, promised to assume the entire expense of this new wing, and its equipment. The report of the superintendent showed that the number of patients admitted during the year ended December 31st last was 4,673, an increase of 364 on the previous year. In the out-patient department the total number of patients treated was 4,579, and the aggregate of visits was 29,204. The ambulance made 1,644 trips, as against 1,481 calls the previous year. The income for the year was reported at \$199,564.25, while the expenditure amounted to \$214,027.41, leaving a deficit of \$14,463.16 to be provided for.

THE ninth annual Congress of the Association Internationale de Perfectionnement Scientifique will be held from the 3rd to the 31st of August, 1912, in the Balkans, in Turkey, and in Greece. The first meeting will be held at Evian-les-Bains, and the last at Aix-les-Bains. The general secretary, Dr. Ghislain Housel, may be addressed at 12 Rue François-Millet, Paris XVI.

THE trustees of the National Sanitarium Association advise that a free dispensary for charity patients has been opened in connexion with the head office at 347 King Street West, Toronto. This institution will be under the joint supervision of Dr. Kendall, physician-in-chief, Muskoka, and Dr. Debbie, physician-in-chief of the Toronto Free Hospital.

THE trustees of the National Sanitarium Association announce that they have appointed Dr. W. P. Caven, Dr. J. T. Fotheringham, Dr. H. B. Anderson, and Dr. Harold Parsons as consultants to the Muskoka Cottage Sanatorium and the Muskoka Free Hospital.

Medical Societies

MONTREAL MEDICO-CHIRURGICAL SOCIETY

THE seventh meeting was held January 5th, 1912. The following programme was presented:

CASE REPORTS: (1) Endocarditis, H. B. Cushing; (2) Some Cases of Fractured Pelvis, J. M. Elder.

PAPER: Clinical and Pathological Notes upon Certain Sub-Tropical Diseases. Illustrated by lantern slides. Fraser B. Gurd.

SYNOPSIS OF PAPER: Factors determining relative incidence of disease in different latitudes; study of amoebiasis, uncinariasis, pellagra, and leprosy.

PATHOLOGICAL SPECIMENS: Series by A. H. MacCordick:

1. Ruptured Duodenum. In a male aged twenty-four, who fell forty feet. Patient died two hours after admission. There had been continuous vomiting of blood, with distended and rigid abdomen.

2. Ruptured Spleen. Child of three years fell sixteen feet. Admitted to the hospital twenty-four hours later in a state of shock, with distended and rigid abdomen. Operation revealed a lacerated spleen, which was removed. The blood count was little affected. The child is now well, two years after the accident.

3. Ruptured Kidney. Man aged fifty, fell two feet, striking his side against a scaffold. He went to a Winnipeg hospital, where ruptured kidney was diagnosed, but operation refused. He entered

the Montreal General Hospital four months after the accident with a tumour in the side, weakness, and emaciation. He passed large clots of blood per rectum. Died ten days after admission. Autopsy revealed perinephritic abscess which perforated the bowel, with ruptured kidney.

The eighth meeting was held January 19th, for which the following programme was prepared:

LIVING CASE: Dentigerous Cyst. E. Hamilton White.

PATHOLOGICAL SPECIMENS: (1) Stomach from a case of Carbolic Acid Poisoning; (2) Carcinomatous Ulcer of Rectum; (3) False Passages in Urethra. E. J. Mullaly.

PAPER: Endocarditis. J. C. Meakins.

CASE REPORTS: (1) Interesting Case of Injury to Spinal Cord, D. A. Shirres; (2) Notes from the Mayo Clinic, J. Alex. Hutchison.

TORONTO ACADEMY OF MEDICINE

THE monthly general meeting of Toronto Academy of Medicine was held January 2nd. Dr. Powell referred to the death of Dr. Samuel Westman, a valued Fellow. He named Drs. Fotheringham and Henderson as a committee to draught a suitable resolution, to be brought before the Academy at a subsequent meeting.

A resolution was passed that a deputation be sent to the provincial secretary in connexion with the difficulty which many members were experiencing from the regulations for the use of motor cars.

A resolution was presented reprobating the secret division of fees, and an animated discussion followed. It seemed to be the opinion of most of the surgeons present that the conditions suggested in the resolution did exist, and that such practices should be dealt with severely. The fact was elicited, however, that there was some slight imperfection in the wording of the motion. Dr. H. S. Anderson moved, seconded by Dr. John Hunter, that the whole matter be referred back to a committee chosen from the different classes of the profession. This motion carried.

SHERBROOKE MEDICAL SOCIETY

THE annual meeting of the Sherbrooke Medical Association was held December 22nd. The officers for the following year are: president, Dr. E. J. Williams; vice-president, Dr. F. Bertrand; secretary-treasurer, Dr. F. A. Gadbois; council, Drs. Austin, Camirand, Mackay, and Ledoux.

CAPE BRETON MEDICAL SOCIETY

THE Cape Breton Medical Association held its annual meeting on December 9th. The following officers were elected: president, Dr. G. H. Murphy; vice-president, Dr. J. K. Macleod; secretary-treasurer, Dr. J. G. B. Lynch.

HURON MEDICAL ASSOCIATION

THE Huron Medical Association met December 13th. This association has been in existence for over forty years, and a measure of reorganization was required. New by-laws were adopted, and the officers for the following year appointed. The meetings will be held at Wingham, Goderich, Seaforth, and Clinton, alternately. The next meeting will be held in Wingham in March.

SOUTH ONTARIO AND WEST DURHAM MEDICAL ASSOCIATION

THE annual meeting of the South Ontario and West Durham Medical Association was held at Oshawa, December 27th. The retiring president, Dr. C. F. Macgillivray, delivered an address. The election of officers resulted as follows: honorary president, Dr. J. T. Fotheringham; president, Dr. A. Farncomb, Newcastle; vice-president, Dr. Beith, Bowmanville; secretary-treasurer, Dr. J. F. Finnigan, Oshawa; executive committee, Dr. John Moore, Brooklin; Dr. R. Beit, Oshawa; Dr. Proctor, Whitby; and Dr. McCulloch.

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VANCOUVER MEDICAL ASSOCIATION

At the annual meeting of the Vancouver Medical Association the following officers were elected for the ensuing year: President, Dr. W. B. McKechnie; vice-president, Dr. W. F. Coy; secretary-treasurer, Dr. J. W. McIntosh; auditor, Dr. W. L. Coulthard.

October 23rd. The Clinical Section met in the General Hospital, when Dr. A. W. Hunter was appointed chairman and Dr. McDermot, secretary.

November 27th. The second meeting of the Section was held in St. Paul's Hospital, when interesting cases were shown and discussed.

November 13th. Dr. W. B. McKechnie, the incoming president, delivered his inaugural address. Dr. V. E. D. Casselman read a paper on "Eclampsia," and cited several cases from practice. Dr. W. B. Burnett was appointed to the staff of the General Hospital.

December 11th. At the general meeting of the Society papers were read as follows:

1. Drs. Burnett and Gourlay, "Summary of recent report of treatment in obstetrics in Dublin Rotunda."
2. Dr. F. G. Logie, "Report of cases of rheumatic fever in infants."
3. Drs. Spankie and Schinbein, "Cases of complete excision of the penis."

THUNDER BAY MEDICAL SOCIETY

THE following officers were elected at the annual meeting of the Thunder Bay Medical Society: Honorary president, Dr. A. Beck; president, Dr. M. B. Dean; vice-president, Dr. Crawford McCullough; secretary-treasurer, Dr. Aikens; executive, Dr. Pratt and Dr. Wodehouse.